Hutchinson Lakes/River Basin Improvement Study

Prepared for the City of Hutchinson, Minnesota

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Acronyms

Acronym	Description
BMP	Best Management Practices
CLP	Curly-leaf pondweed
CROW	Crow River Organization of Water
DNR	Minnesota Department of Natural Resources
LCCMR	Legislative-Citizen Commission on Minnesota Resources
LSOHC	Lessard-Sams Outdoor Heritage Council
MPCA	Minnesota Pollution Control Agency
SWCD	McLeod Soil and Water Conservation District

1.0 Introduction/Background

The City of Hutchinson (Hutchinson) contracted Barr Engineering Co. (Barr) to perform a Hutchinson Lakes/River Basin Improvement Study to gain a better understanding of the current condition of the river/lakes and dam in order to identify activities that may be implemented to effectively improve the valuable public resource and recreational amenity in the heart of downtown.

The study area consists of two lakes, Campbell and Otter, which constitute a contiguous water body of approximately 650 acres created by a dam/spillway constructed at the east end of Otter Lake, in the South Fork of the Crow River adjacent to the Main Street Bridge (Figure 1).

The original dam, built in the late 19th Century, was replaced in 1965 by a fixed-crest concrete weir with tainter gates and a slide gate to provide more discharge during high-flow conditions, which was subsequently replaced in 2008 by a fixed-crest rock riffle dam and spillway, constructed to retain water in the basin at a minimum elevation of 1037.8 feet [slightly lower than the previous dam crest (1038.5 feet) so as not to impact flood levels].

The dam was reconstructed in 2008 to provide a passive structure allowing the passage of fish and other aquatic species. The replacement dam is a rock riffle structure consisting of a series of stepped-boulder weirs and a steel sheet-pile wall at the upstream crest. The new dam replaced a concrete weir with two tainter gates, and was designed to maintain equal or lower upstream flood elevations for a 100-year flood event. To maintain the previous capacity of the dam, the new dam was pushed upstream to allow for a longer crest. Additionally, the dam was lowered approximately 6 inches to maintain flood levels equal or below previous conditions for a 100-year flood event.

The rock riffle dam consists of a sheet-pile wall and rock designed to allow water above the elevation of the sheet-pile wall (1,037.8') to flow over the rocks and through a series of pools constructed downriver of the dam. The design of the dam allows public access on and around the dam, and Hutchinson staff have indicated local residents have questioned the upstream pool elevation and raised concerns regarding whether the dam is "leaking." These questions and concerns are likely due to residents observing water flow over and through the rocks, as well as slightly lower pool elevation during low flow conditions; both of which are design features of the new dam.

The Hutchinson water bodies provide a wide variety of recreational uses, but shallow water, vegetation growth, and sedimentation issues, which have historically impacted the basin due to the sediment load entering through the Crow River and outfalls, have altered the potential uses and limited access to parts of the lakes/river.

Additionally, sedimentation and nutrient enrichment have resulted in poor, eutrophic water quality and designation as an impaired water. Hutchinson staff indicated the water clarity has improved since a winterkill eliminated many of the carp and other rough fish in the basin, allowing increased light penetration and the production of aquatic vegetation. This water clarity improvement and resulting

vegetation has caused another resident concern regarding the proliferation of aquatic vegetation/"weeds" in the Hutchinson water bodies.

Hutchinson wants to develop lakes/river basin strategies to manage this valuable city resource for long-term sustainability and public use. This study represents an important step in developing an effective lake management strategy by gaining an understanding of the current bathymetry of the basin, which helps identify which portions of the basin have been impacted by sediment deposition. Areas with heavy vegetation growth were also identified during the bathymetric survey to aid in identifying potential sediment management strategies to maintain and expand public access.

2.0 Investigation/Evaluation

This Hutchinson Lakes/River Basin Improvement Study included collection of survey data on the basin (bathymetry) and the dam (sheet-pile wall) completed by Hutchinson staff, as well as sediment sampling completed by Barr and Hutchinson staff. Available aerial photographs dating back to 1940 were reviewed to determine how stable, or variable, the shoreline of the lakes/river basin has been over time, as well as provide context for how development has occurred around the basin and the potential effect on sedimentation. Select historical aerial photographs are reproduced in Appendix A.

2.1 Dam

Hutchinson staff performed a survey of the top of the dam sheet-pile wall at seven locations previously surveyed upon completion of dam construction (Figure 2). Barr compared the results of the sheet-pile wall survey, reviewed the previous design, record drawings, and memorandum, and observed the condition of the rock crest and chinking material to evaluate if the rock riffle dam constructed in 2008 is performing as designed.

2.2 Bathymetry/Vegetation

Hutchinson staff performed a bathymetric survey using sonar equipment (Lowrance®) to obtain sediment surface elevation data, which was processed using BioBase® software and used to determine the water depth and presence of vegetation (Figure 3). The resulting bathymetry (i.e., sediment surface) was compared to 1976 bathymetric data from the Minnesota Department of Natural Resources (DNR) (Figure 4) to evaluate where sediment deposition has occurred within the basin (Figure 5). The 1976 map was based on a limited number of data points, primarily through the center of each water body, so direct comparison to current conditions is not possible and the water depth changes presented in Figure 5 should be viewed as relative.

Additionally, areas with significant floating-leaf vegetation identified using BioBase® and field crew observations are presented on Figure 3. Hutchinson consulted DNR staff to help identify the primary types of vegetation present in the water bodies.

2.3 Sediment

Hutchinson and Barr staff performed sediment sampling using coring tubes to collect surficial sediment to determine sediment characteristics and potential chemicals of concern, in several locations within the basin, including areas where sediment dredging may have the greatest impact on use of the water bodies (Figure 3), an important consideration due to the expense of dredging, dewatering, and managing sediment.

The purpose of this sediment sampling was to identify the following information in these selected locations:

- Native sediment elevation
- Thickness of soft sediment
- Sediment characteristics, including presence of non-sediment materials
- Baseline analytical chemistry, as specified in the Minnesota Pollution Control Agency (MPCA) Managing Dredged Materials guidance (MPCA 2009)

Selected sediment samples were submitted to Pace Laboratories for analysis of the MPCA-recommended baseline parameters:

- Arsenic
- Cadmium
- Chromium III
- Chromium VI
- Copper
- Lead
- Mercury
- Nickel
- Selenium
- Zinc
- Total Phosphorus
- Nitrate+Nitrite
- Ammonia-Nitrogen
- Total Kjeldhal Nitrogen
- Total Polychlorinated Biphenyls (PCBs)
- Total Organic Carbon
- Sieve-Hydrometer (grain size)

Sieve-hydrometer testing was performed on each sediment sample submitted for analysis to ensure analyzed samples consist of the appropriate grain size (silts and clays) prior to laboratory analysis, in accordance with MPCA guidance, which states samples containing 93%, or more, material greater than the 200 sieve size/75 microns (i.e., sand) should not be analyzed (MPCA 2009).

3.0 Results

The Hutchinson lakes/river basin has maintained the same general shoreline throughout the time period for which aerial photographs are available (1940 to present). Aerial photographs through 1955 show that development was limited to the area near the dam (Main Street) to approximately the location of the current School Road Bridge. By 1975, development which appears to be primarily residential extends to the "Y" where Otter Lake turns south and Campbell Lake is to the north. The historical aerial photographs indicate development continued to expand along the shoreline until most of the shoreline, with the exception of the southern portion of Otter Lake (south of South Grade Road SW) is currently developed and has been since the 2000s. A golf course is evident on the northeast corner of Campbell Lake in the 1990s to the present day.

3.1 Dam

The dam survey and observations performed in 2017 were compared to design drawings from 2007 to confirm that sheet-pile wall and rock riffles, with chinking material, are functioning as intended. Sheet-pile wall survey locations and elevations, including comparison of 2017 surveyed elevations to 2007 design drawing elevations, are presented on Figure 2.

A technical memorandum describing the results of the dam evaluation is included as Appendix B.

3.2 Bathymetry

The reference, or baseline, bathymetry used to evaluate changes in basin bathymetry and the potential effects of sedimentation in this study is a 1976 DNR "Campbells and Otter Lake (43-85), McLeod County map (B-0461)," reproduced as Figure 4.

The character of the lakes/river basin was not significantly different in 1976 with Otter Lake showing water depths up to 6 feet in the area south of South Grade Road SW and up to 4 feet in the remainder of Otter Lake, including the east-west trending (river) portion of the lake. Most of Campbell Lake was 3 to 4.5 feet deep in 1976, with a limited connection to Otter Lake under State Highway 7/22, and an open county ditch discharging at the north end of the basin.

The bathymetry of the basin and locations with significant vegetation were determined based on interpretation of sonar data using BioBase® software and field crew observations from surveys completed in 2016 and 2017 (Figure 3). The overall character of the lakes/river basin has not changed significantly since 1976.

A comparison of the 2016/2017 bathymetry to the 1976 bathymetry shows the apparent bathymetric change in the last 40 years (Figure 5). The bathymetric change is referred to as apparent, or relative, due to the limited number of 1976 data points and the difficulty comparing data sets that were created using different methods, with little understanding of the comparative accuracy of the location and relative elevation of the 1976 measurements.

Otter Lake south of the Crow River discharge remains the most consistently deep portion of the basin, with water depths up to 6 feet and very little apparent change from 1976. Four areas within the east-west trending (river) portion of Otter Lake appear shallower than in 1976: east of the Crow River discharge and delta; in Lewis Bay, on the south shoreline west of the School Road bridge; on the north shoreline between Mason Park and Jaycees Park; and from Jaycees Park to the dam. Most of these shallower areas are approximately 1 to 2 feet shallower, with the exception of Lewis Bay, which is up to 4 feet shallower. Most of Campbell Lake, including the middle portion of the lake, is up to 2 feet shallower than in 1976.

3.3 Vegetation

The extent of aquatic vegetation in the basin has grown in recent years. During the drawdown of the basin for the dam project, there was little evidence of vegetation growth throughout the basin, with isolated areas of aquatic vegetation prior to the dam project and shortly thereafter.

More widespread growth of curly-leaf pondweed (CLP) was observed in 2015 than in the past. Hutchinson staff mapped the extent of CLP during the bathymetric surveys in 2016/2017 and it appears to be confined to areas shallower than 3 feet of water depth (Figure 3), though CLP has the ability to grow in much greater water depths (Bolduan et. al 1994). CLP, a plant native to Europe, Asia, northern Africa, and Australia (U.S. Forest Service, 2012), was first introduced to the United States in 1859 (Nichols et al., 1986). CLP spread from Wilmington, Delaware, where it was first found, throughout the United States (Bolduan et al., 1994).

CLP differs from native plants that generally begin their growth cycle in spring and end their growing season by fall. CLP begins its growing cycle in late summer, continues to grow through the fall and winter, grows very rapidly in spring after ice-out, and finishes its growing cycle in early summer (as shown on Figure 6, below). CLP generally reproduces from turions, overwintering buds, which perform a similar role as seeds in native species. Studies show that each CLP plant can produce up to 900 turions (Catling et al., 1985) and turions can remain viable for several years (Newman 2009). CLP's ability to produce large numbers of turions and its unique growing cycle give this species a competitive advantage over native species. CLP begins its growth cycle when native species have ended their growth cycle and are no longer competing for space on the lake bottom. CLP is actively growing when natives begin their growth cycle. Hence, natives are restricted to areas not already occupied by CLP.

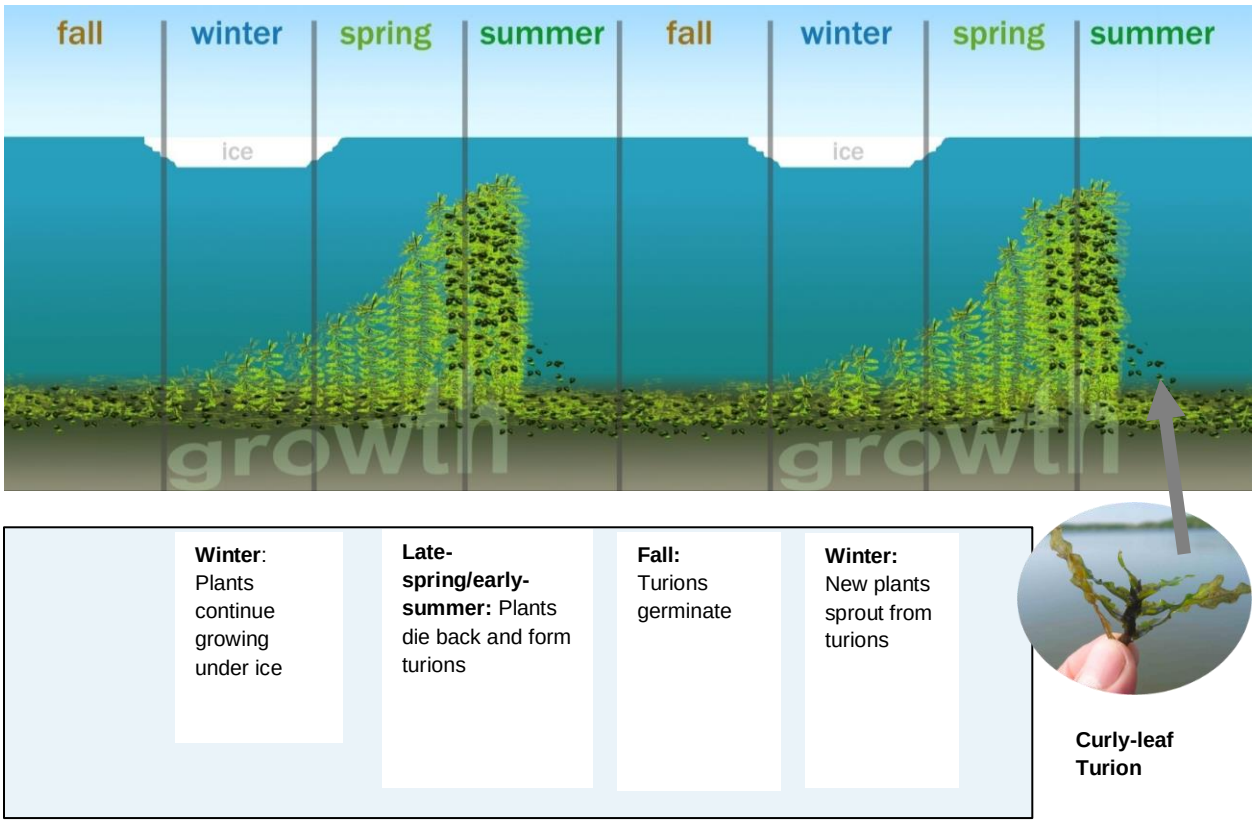

Figure 6 Curly-leaf Pondweed Growth Cycle

A wide range of habitats and soil conditions are suitable for CLP growth. CLP is frequently been found growing in silt or clay sediment, but has also been found growing in gravel, sand, or organic substrate.

3.4 Sediment

Sediment samples collected from locations identified on Figure 3 consisted primarily of organic silt, with clay, some leaves, twigs, shells, peat, and other organic material in approximately the top 3 feet of sediment encountered. The cores that were able to recover sediment below the organic mud contained black, organic clay at locations at the edge of the delta (62, 72) and in the river channel near the dam (178). Sand, grading from very fine silty sand to coarse sand with gravel was encountered below the organic mud near the westernmost portion of the east-west trending portion of Otter Lake (129). Sediment coring logs are included in Appendix C.

With one exception, sediment samples submitted for laboratory analysis did not detect any of the chemicals identified in MPCA guidance (MPCA 2009), and listed in Section 2.3, at concentrations higher than the Recreational Soil Reference Values (SRVs). Arsenic was detected at a concentration of 9.2 milligram per kilogram (mg/kg), or parts per million (ppm) in sediment collected at sample location 50 (Figure 3), which is only slightly elevated above the SRV of 9.0 mg/kg. Sample location 50 was collected

from a water depth of more than 4 feet. Laboratory analytical results are summarized in Table 1 and included in Appendix D.

4.0 Discussion

4.1 Dam/Spillway Functionality and Performance

Review of the current conditions of the Hutchinson dam/spillway provided the following conclusions, presented in more detail in Appendix B:

- The survey completed by Hutchinson in 2017 indicates no movement or settlement of the boulders at the upstream crest.
- Visual observations of the dam crest show water is flowing over the top of the sheet pile weir, and over the lower elevation boulders in the center of the dam as originally designed.
- Visual observations show chinking and low-permeable materials remain in-place upstream of the crest minimizing leakage through the dam; however, minimal chinking material is present in the boulder gaps allowing for water to flow around the boulders. This is consistent with the intention of the design; however, placement of upstream chinking rock may help maintain a slightly higher pool elevation during low-flow periods, but is at risk to wash downstream as flows over the spillway increase.

The Hutchinson Dam Functionality Update technical memorandum (Appendix B) concludes the dam is functioning as originally designed. The estimated pool elevation is near levels estimated during the design; however, additional monitoring of pool elevations during various flow events would be required to confirm this conclusion.

4.2 Sedimentation and Sources

The primary areas where sedimentation and sediment deposits have likely had the most effect on public use are the Crow River delta area, Lewis Bay, and Campbell Lake. Sedimentation in the West River Park Boat Landing has also likely influenced use of the basin as the primary point for public access to the basin.

Source control for sediment entering the basin is an important consideration when evaluating if, and where, to dredge in order to provide increased public access and use of the lakes/river. If the source of the sediment load isn't controlled, the improvements will be temporary as the sediment carried by the river and the stormwater discharges settle, likely in the same areas that are currently experiencing sedimentation that affects public use of the basin.

The sediment load carried by the Crow River has formed a delta and additional shallowing has occurred as the sediment is carried into the lower energy environmental of Otter Lake. Sediment control in the Crow River is out of Hutchinson's control as it is dependent on land use, including agricultural practices, within the river's extensive watershed. As such, any sediment management strategies must account for continued sediment load entering the basin from the river.

In addition to the sediment load entering the basin from the Crow River, there are 37 direct stormwater discharges that are likely contributing sediment to the basin, and the portions of the basin that have

become shallower since 1976 (presented in Section 3.2) are located in areas with significant stormwater discharges.

An 18-inch county tile discharges to an open county ditch at the northern tip of Campbell Lake and there are five additional stormwater outlets (two 12-inch; two 15-inch; and one 30-inch diameter) into Campbell Lake. There is also a limited hydraulic connection to Otter Lake, below Highway 7/22.

An 84-inch diameter stormwater discharge into Lewis Bay likely includes a significant amount of sediment as it drains a large portion of the downtown area. The area near the West River Park Boat Landing has two large stormwater outlets (54-inch and 36-inch diameter) that also likely carry a significant sediment load.

It is anticipated that without investment in stormwater sediment controls, which can be expensive to implement and difficult to maintain, these stormwater discharges will continue to provide sediment load to the basin. As such, any sediment management strategies should account for the continued sediment load entering the basin from the stormwater discharges; including the county ditch and other discharges to Campbell Lake, and the large diameter discharges in Lewis Bay and West River Park Boat Landing.

4.3 Public Use

The basin is utilized by the public for a variety of purposes common for lakes and rivers; fishing, boating, watersports, and wildlife observation.

In addition to public access by personal boats/watercraft, Hutchinson operates a canoe/kayak/paddleboard rental program at the West River Boat Landing throughout the summer. Continued operation of this program provides direct access to the lakes/river and creates recreational opportunities for people that do not own, or have access to, watercraft that allow them to enjoy and utilize the water resource.

Fishing is very common at various locations around the water bodies. The primary target species are walleye and crappie, but there is a wide range of species that include bluegill, northern pike, largemouth bass, yellow perch, channel catfish, and various species of rough fish.

Limitations to public use of the lakes/river basin that restrict opportunities or create hazards in the water bodies come in various forms. The most common is shallow water that, in most areas, is caused by sedimentation, which is further magnified by aquatic vegetation growth. There is a historical shallow rock/gravel bar that is located near the north shoreline between the School Road Bridge and West River Boat Landing. This area is typically marked with buoys to inform boaters of the hazard.

Campbell Lake has limited public access from the main basin (Otter Lake) due to a small culvert between the two water bodies. Fishing access along the Highway 7/22 right-of-way is available to shore anglers, but public boat access is limited to carry-in only.

Due to the nature of a flowing river, there is the occasional risk of logs in the water bodies. Oftentimes, this type of hazard remains out of site just below the surface and is especially dangerous to boaters moving at higher speeds.

4.4 Vegetation

The extent of aquatic vegetation, specifically CLP, has expanded in the basin in recent years. CLP frequently grows prolifically and creates problematic conditions – beds of plants that reach the surface and grow very densely. The expansion of CLP observed in 2015 indicates further expansion is likely, with the continued expansion due to the additional turions (reproductive structures that play a similar role as seeds) added to the lake annually and a favorable growth cycle (Figure 6). Light penetration is a key variable that limits its expansion, so as the water clarity in the basin has improved since the winterkill that eliminated many of the rough fish in the basin, it has likely contributed to the expansion of the extent of CLP.

A DNR fact sheet on CLP, included as Appendix E, indicates that eradication or elimination of CLP from entire lakes/rivers is not a realistic goal; however, there are CLP control/treatment methods, including mechanical removal and chemical treatment, which can be used to control CLP in focused areas.

5.0 Recommendations

5.1 Dam/Spillway Performance, Monitoring, and Measurement

The dam/spillway is performing as expected and no modifications to the dam are recommended based on this evaluation (Appendix B).

Hutchinson may wish to periodically monitor pool elevations and flow in order to make a definitive conclusion regarding actual pool elevations in relation to flow events and provide data for comparison to the predicted pool elevation for those flow events. These periodic measurements will allow Hutchinson to better understand what pool elevations, and associated issues/concerns, are expected at various flows.

5.2 Sediment Removal and Management

Sediment removal by dredging is likely the only option available to Hutchinson to deepen portions of the basin that have been impacted by sedimentation. The two primary methods of dredging include mechanical (i.e., using excavators on floating equipment or low-ground-pressure excavation equipment in areas that have insufficient access for floating equipment) and hydraulic (i.e., using suction with a cutting mechanism to loosen the sediment).

Mechanical dredging is generally more expensive per cubic yard to remove and transport to the staging area than hydraulic dredging, but requires significantly less dewatering and associated costs. Dewatering hydraulically dredged material, which typically contains less than 10% solids, not only costs more but also requires a significantly larger staging area than mechanical dredging.

Dredging material from the Crow River delta, Lewis Bay, or the West River Park Boat Landing would be relatively straightforward using mechanical dredging methods, assuming there is an available staging/dewatering area with access to Otter Lake.

Campbell Lake presents some additional logistical issues related to access, staging/dewatering area, and/or transport due to limited access for mechanical dredging equipment and/or the additional dewatering costs for hydraulic dredging if that is determined to be technically feasible.

Based on these factors, following is a preliminary dredging priorities list (with the acreage of the area in parentheses, and presented on Figure 3):

- **West River Park Boat Landing (approximately 6 acres) and/or Lewis Bay (approximately 17 acres):** These would likely both be able to be completed using mechanical dredging methods; however, sediment source control should be evaluated in conjunction with a determination to dredge these areas due to significant stormwater discharges to both, which will affect how long the dredged depth will remain without sediment source control or maintenance dredging.
- **Crow River delta and areas immediately east of the delta (approximately 35 acres):** This area would likely be able to be completed using mechanical dredging methods; in the case of the river,

sediment source control is more difficult because it's related to non-point source discharges in the Crow River watershed.

- **The channels connecting Campbell and Otter Lakes (below Highway 7/22) and the southern end of Otter Lake (below County Road 115):** These areas would likely be able to use mechanical equipment, with the possible exception of the Campbell Lake side of the culvert under Highway 7/22, where hydraulic or low-ground-pressure equipment may be necessary.
- **Campbell Lake (approximately 150 acres), including the channel area on the Campbell Lake side of Highway 7/22 (approximately 35 of the 150 acres):** This area may require use of hydraulic dredging equipment or smaller, less-efficient mechanical methods, due to the limited access for larger floating mechanical equipment.

The laboratory analysis of the sediment, including in the areas of the basin identified above, indicates that the material may potentially be used as daily cover at the composting material, which will likely be the most cost-effective disposal method for the dredged material. The only sediment sample exceeding MPCA SRVs (a slightly elevated arsenic concentration at sample location 50) was collected from a water depth of more than 4 feet in an area of Otter Lake that is a low priority for sediment removal. Additional testing will likely be required in order to get permits for sediment removal and dredged material disposal.

Dredging and dewatering costs are highly dependent on a wide variety of factors that are difficult to estimate with the limited information available at this stage of potential project definition (less than 5% project definition) and, as such, the following cost ranges for the two primary dredging methods are for general discussion purposes only (approximately Class 5 costs that are +100%/-50%). Mechanical dredging removal costs are generally in the range of $15 to $25 per cubic yard to remove the material, and $5 to $10 per cubic yard to dewater the material. Hydraulic dredging removal costs are generally in the range of $10 to $15 per cubic yard, with dewatering costs of $25 to more than $35 per cubic yard, depending on the method and volume of treatment required. Additional costs, some of which can be significant, involved in any dredging project include mobilization/demobilization, material handling/loading, transportation (trucking and/or pumping), permitting, design, and other potential associated activities such as preparation of staging and/or disposal areas. All of these costs are dependent on the volume of material to be dredged and the amount of dewatering required for final disposition of the dredged material.

A dredging feasibility evaluation, which would include increase the project definition and provide assumption to further refine estimated dredging costs and determine the most cost-effective methods to remove, dewater, transport, and dispose of the material, was not completed as part of this study. Such a study would be the likely next step in evaluating whether dredging areas of the Hutchinson lakes/river basin is feasible in order to improve public access to this important city resource, and to more fully evaluate the dredging priorities outlined above.

5.3 Fish/Wildlife Habitat, Water Quality Improvements

There are a variety of improvements on the land and water that affect various aspects of this study, and can be implemented to improve the condition of the Hutchinson lakes/river basin. Some common practices include:

- Improving water quality through sediment and nutrient source reduction
- Public education regarding pollution prevention, including residential activities that impact stormwater sediment and nutrient loading
- Identifying and implementing best management practices (BMP), including land use BMPs
- Identifying and implementing shoreline restoration projects
- Disconnecting drainage and runoff from impervious surfaces to the water bodies

There is a diverse suite of direct and indirect BMPs that can implemented, installed, and identified that help to improve water quality and/or provide additional habitat to fish and wildlife. Working closely with technical experts and developing project partnerships can sometimes be the best way to efficiently and effectively design and deliver programs/projects that provide a direct benefit to local water bodies. Project partners that can sometimes help design or partially fund these types of projects include McLeod Soil and Water Conservation District (SWCD), Crow River Organization of Water (CROW), MPCA, Legislative-Citizen Commission on Minnesota Resources (LCCMR), Lessard-Sams Outdoor Heritage Council (LSOHC), DNR, and other entities as funding and resources become available.

Through the use of these tools, Hutchinson can continue to make progress towards improving water quality, fish/wildlife habitat, and public use in, and around, this valuable public resource and recreational amenity in the heart of downtown.

6.0 References

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Tables

Table 1
Analytical Data Summary
Basin Improvement Study
City of Hutchinson

		Location	SED 31	Sed 50	Sed 62	Sed 72	SED 86	Sed 129	Sed 142	Sed 152	Sed 162	Sed 178
		Date	5/24/2017	5/23/2017	5/23/2017	5/23/2017	5/24/2017	5/23/2017	5/23/2017	5/23/2017	5/23/2017	5/23/2017
Parameter	Units	MPCA Residential Soil Reference Values										
Effective Date		06/22/2009										
Exceedance Key		**Bold**										
General Parameters												
Carbon, total organic	mg/kg		33600 71200	62700 62200	37800 38200	40500 41300	72200 74500	36300 36500	72300 75400	37800 40100	36100 36800	55600 58100
Mean Total Organic Carbon	mg/kg		52400 *	62400	38000	40900	73300	36400	73900	38900	36500	56900
Relative percent difference	%		71.7	0.80	1.1	1.8	3.2	0.58	4.1	5.7	1.9	4.4
Moisture	%		69.7	66.6	60.6	48.7	73.7	47.8	56.8	55.0	42.7	62.4
Nitrogen, ammonia, as N	mg/kg		455	484	151	176	437	229	357	184	123	231
Nitrogen, nitrate + nitrite, as N	mg/kg		< 3.3	< 3.0	< 2.5	< 1.9	< 3.8	< 1.9	< 2.3	< 2.2	< 1.7	< 2.7
Nitrogen, total kjeldahl (TKN)	mg/kg		3730	5460	2710	2750	6610	2360	3780	4400 *	2060	4040
Phosphorus, total, as P	mg/kg		566	612	552	485	580	457	635	902	305	488
Metals												
Arsenic	mg/kg	**9**	7.4	**9.2**	6.7	5.8	7.2	4.1	7.9	7.3	4.8	6.4
Cadmium	mg/kg	25	< 0.48	0.51	0.44	0.39	< 0.53	< 0.27	0.50	< 0.32	0.26	0.43
Chromium	mg/kg	87 CR6	18.8	22.2	17.8	14.4	13.4	13.3	18.3	8.1	12.5	17.3
Chromium, hexavalent	mg/kg	87	< 3.1	< 2.9	< 2.3	< 1.9	< 3.5	< 1.7	< 2.3	< 1.9	< 1.8	< 2.6
Chromium, trivalent	mg/kg	44000	18.8	22.2	17.8	14.4	13.4	13.3	18.3	8.1	12.5	17.3
Copper	mg/kg	100	19.7	21.5	17.2	15.1	16.9	11.5	23.1	10.7	11.3	18.5
Lead	mg/kg	300	15.5	15.4	11.6	10	14.7	7.9	33.1	6.1	8.0	14.2
Mercury	mg/kg	0.5	0.081	0.14	0.11	0.10	0.085	0.059	0.12	0.045	0.045	0.092
Nickel	mg/kg	560	21.3	21.4	16.6	14.6	18.5	12.0	17.7	10.8	12.2	17.1
Selenium	mg/kg	160	< 3.2	< 2.9	< 2.5	< 1.9	< 3.5	< 1.8	< 2.2	< 2.2	< 1.7	< 2.5
Zinc	mg/kg	8700	74.1	90.8	72.9	63.1	60.8	52.7	107	37.6	44.4	78.0
PCBs												
Aroclor 1016	ug/kg		< 109	< 98.9	< 83.4	< 64.2	< 125	< 63.1	< 76.3	< 73.3	< 57.3	< 87.7
Aroclor 1221	ug/kg		< 109	< 98.9	< 83.4	< 64.2	< 125	< 63.1	< 76.3	< 73.3	< 57.3	< 87.7
Aroclor 1232	ug/kg		< 109	< 98.9	< 83.4	< 64.2	< 125	< 63.1	< 76.3	< 73.3	< 57.3	< 87.7
Aroclor 1242	ug/kg		< 109	< 98.9	< 83.4	< 64.2	< 125	< 63.1	< 76.3	< 73.3	< 57.3	< 87.7
Aroclor 1248	ug/kg		< 109	< 98.9	< 83.4	< 64.2	< 125	< 63.1	< 76.3	< 73.3	< 57.3	< 87.7
Aroclor 1254	ug/kg		< 109	< 98.9	< 83.4	< 64.2	< 125	< 63.1	< 76.3	< 73.3	< 57.3	< 87.7
Aroclor 1260	ug/kg		< 109	< 98.9	< 83.4	< 64.2	< 125	< 63.1	< 76.3	< 73.3	< 57.3	< 87.7
Aroclor 1262	ug/kg		< 109	< 98.9	< 83.4	< 64.2	< 125	< 63.1	< 76.3	< 73.3	< 57.3	< 87.7
Aroclor 1268	ug/kg		< 109	< 98.9	< 83.4	< 64.2	< 125	< 63.1	< 76.3	< 73.3	< 57.3	< 87.7
Polychlorinated biphenyls	ug/kg	1200	< 109	< 98.9	< 83.4	< 64.2	< 125	< 63.1	< 76.3	< 73.3	< 57.3	< 87.7

Barr Standard Footnotes and Qualifiers

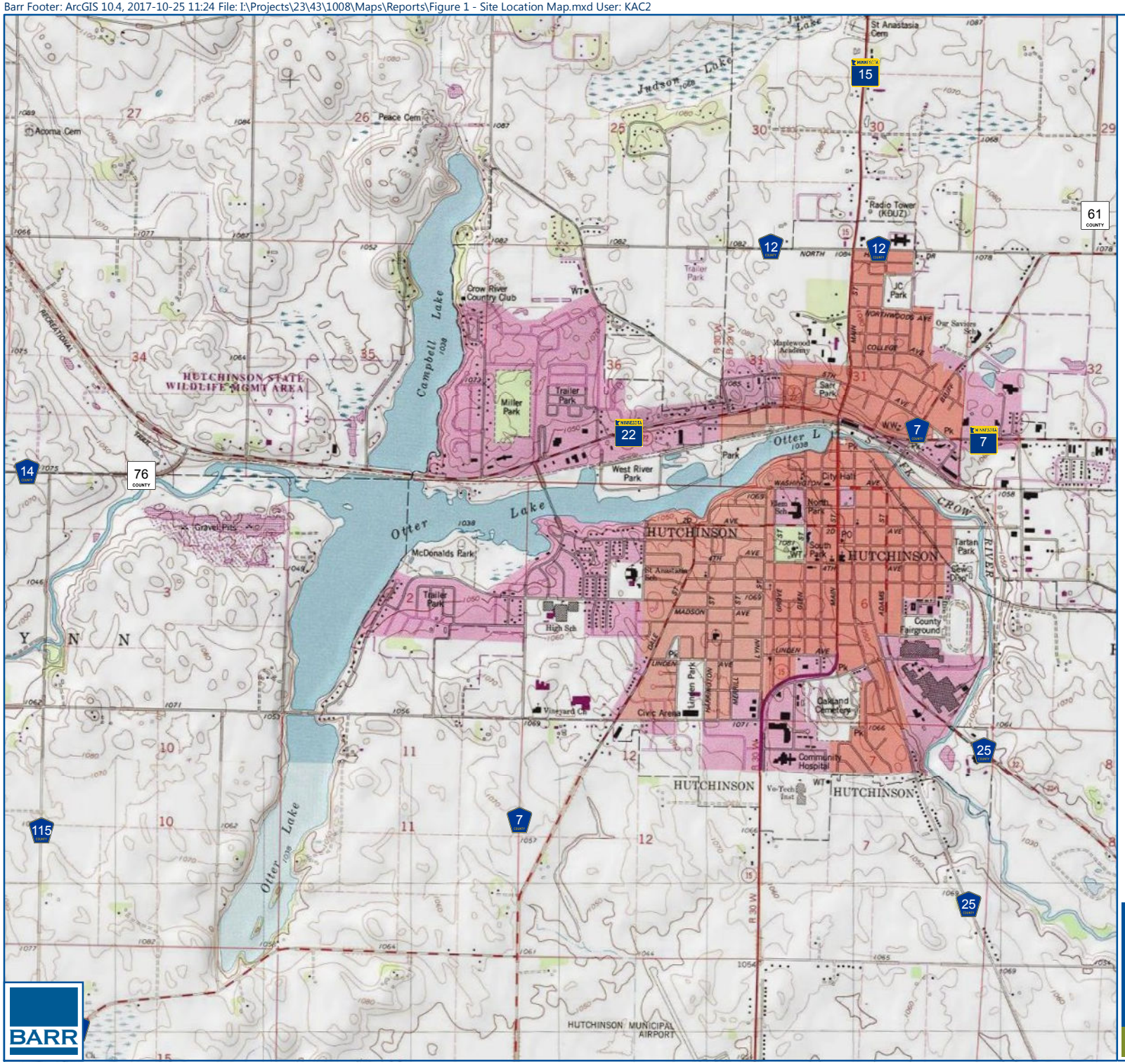
Estimated value, QA/QC criteria not met.

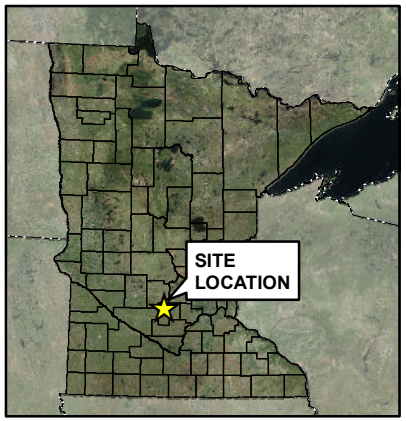
MPCA Tier 1 Soil Reference Values

Value represents the criteria for Chromium, hexavalent.

Figures

Barr Footer: ArcGIS 10.4, 2017-10-25 11:24 File: I:\Projects\23\43\1008\Maps\Reports\Figure 1 - Site Location Map.mxd User: KAC2





N

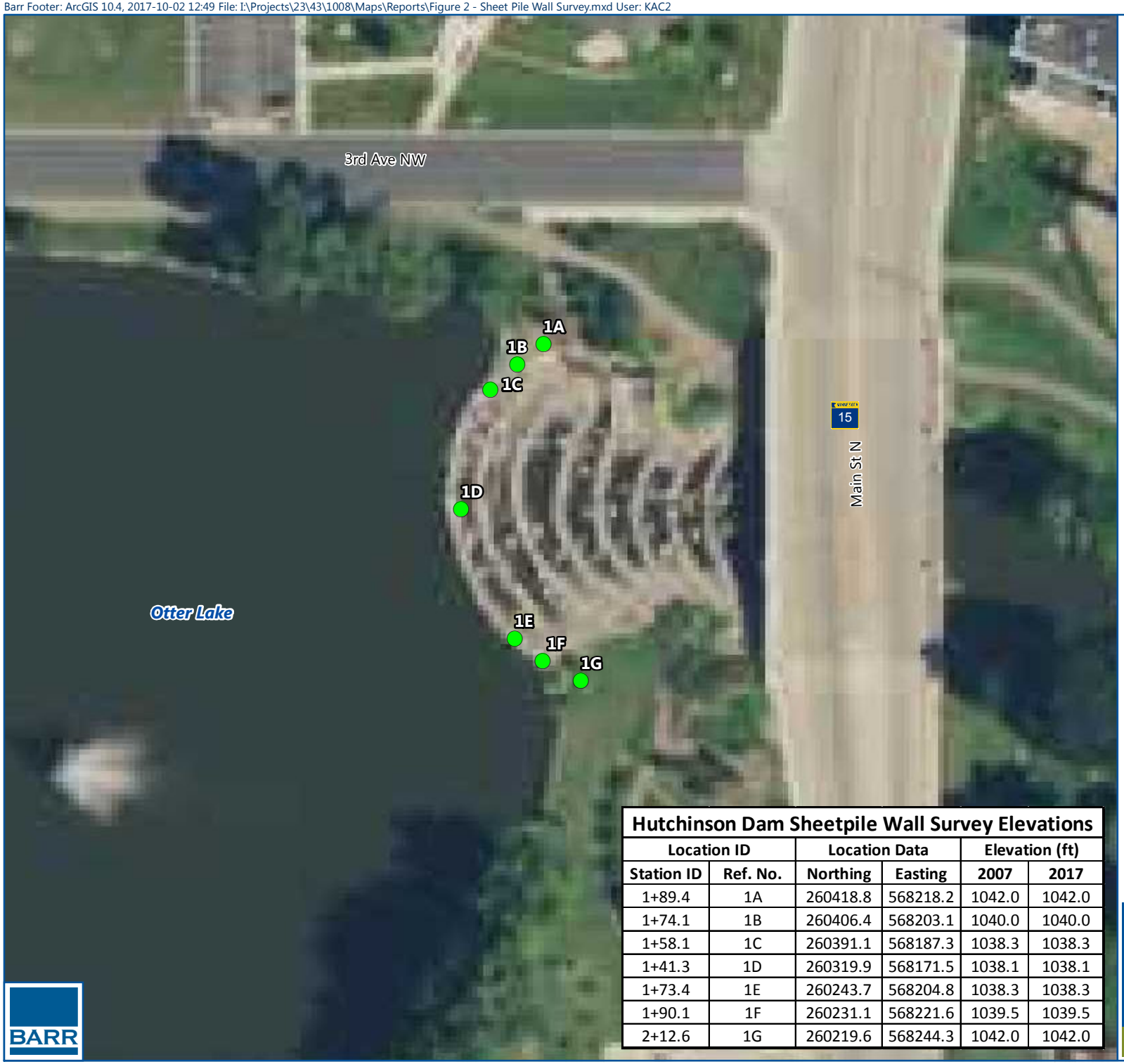
0 3,000 6,000

Feet

SITE LOCATION MAP
Otter and Campbell Lakes
Hutchinson, MN

FIGURE 1

BARR



Sheet Pile Wall Survey Location

Hutchinson Dam Sheetpile Wall Survey Elevations					
Location ID		Location Data		Elevation (ft)	
Station ID	Ref. No.	Northing	Easting	2007	2017
1+89.4	1A	260418.8	568218.2	1042.0	1042.0
1+74.1	1B	260406.4	568203.1	1040.0	1040.0
1+58.1	1C	260391.1	568187.3	1038.3	1038.3
1+41.3	1D	260319.9	568171.5	1038.1	1038.1
1+73.4	1E	260243.7	568204.8	1038.3	1038.3
1+90.1	1F	260231.1	568221.6	1039.5	1039.5
2+12.6	1G	260219.6	568244.3	1042.0	1042.0

N

0 80 160

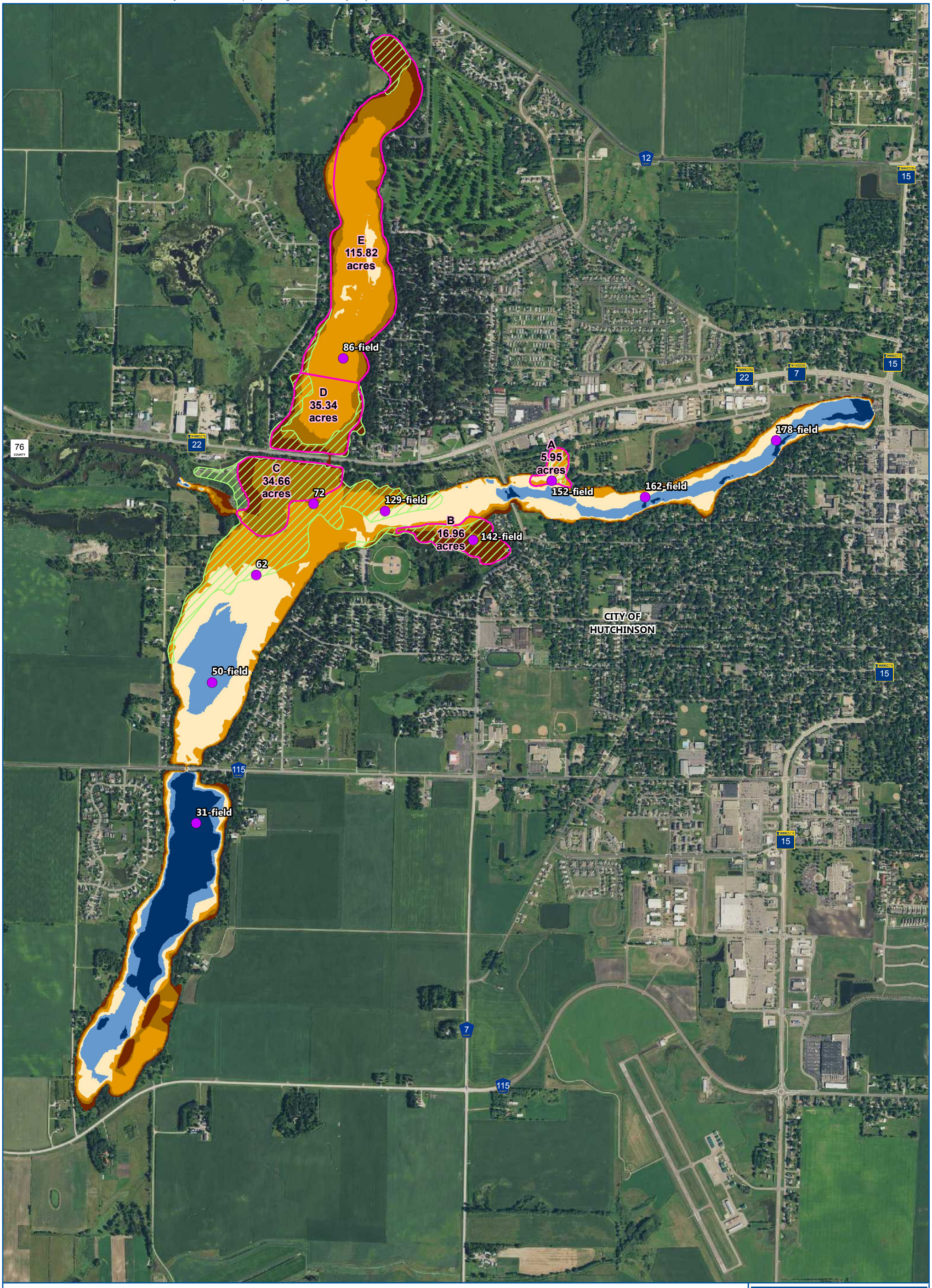
Feet

SHEET PILE WALL SURVEY
Otter and Campbell Lakes
Hutchinson, MN

FIGURE 2

BARR

Barr Footer: ArcGIS 10.4, 2017-10-31 11:16 File: I:\Projects\23\43\1008\Maps\Reports\Figure 3 - 2017 Bathymetry.mxd User: KAC2

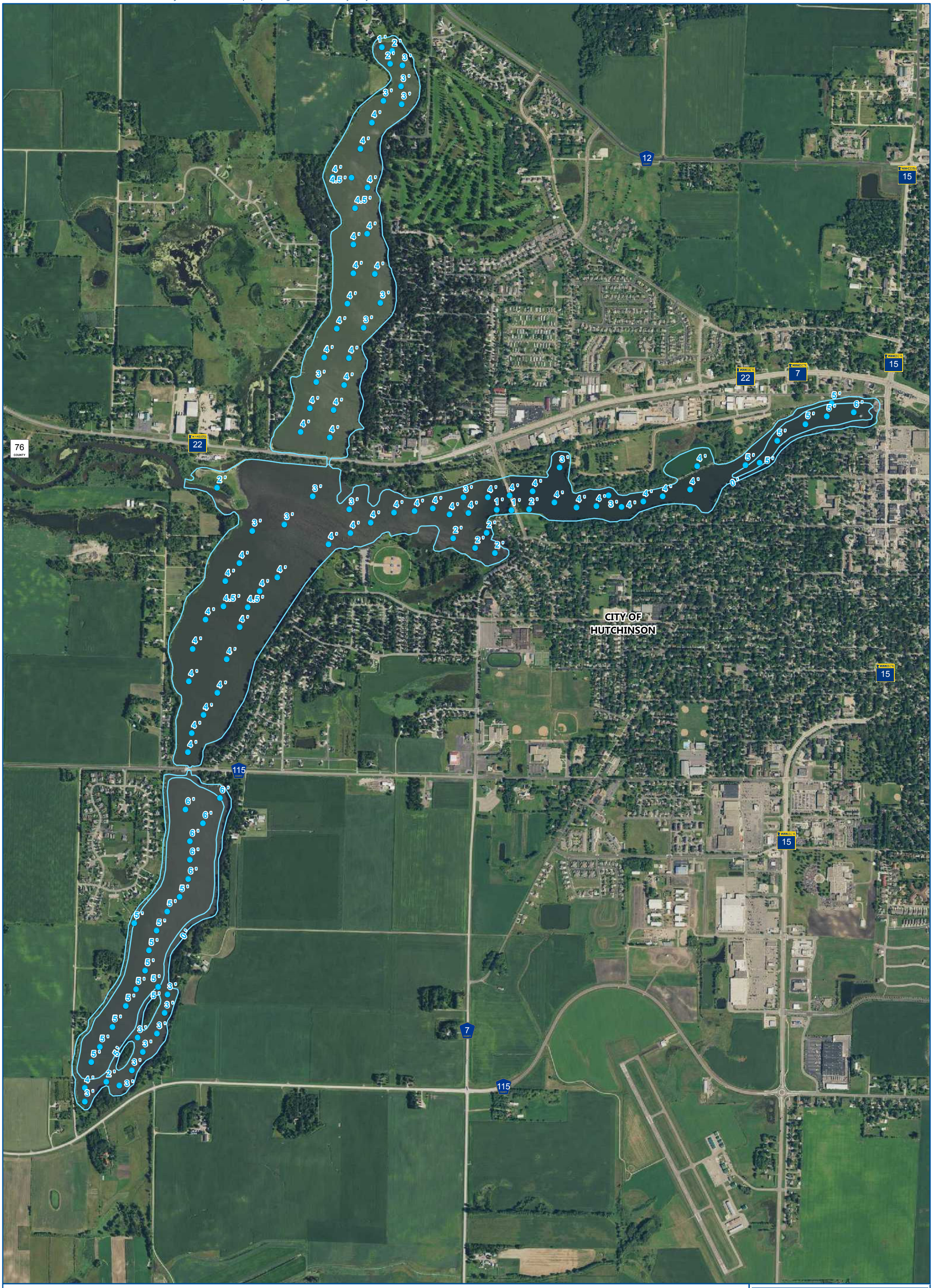


BARR

2017 BATHYMETRY
Otter and Campbell Lakes
Hutchinson, MN

FIGURE 4

Barr Footer: ArcGIS 10.4, 2017-10-31 09:49 File: I:\Projects\23\43\1008\Maps\Reports\Figure 4 - 1976 Bathymetry.mxd User: KAC2



Lake Bathymetric Contours (MN DNR, 1976)

Lake Depth Points (MN DNR, 1976)

BARR

N

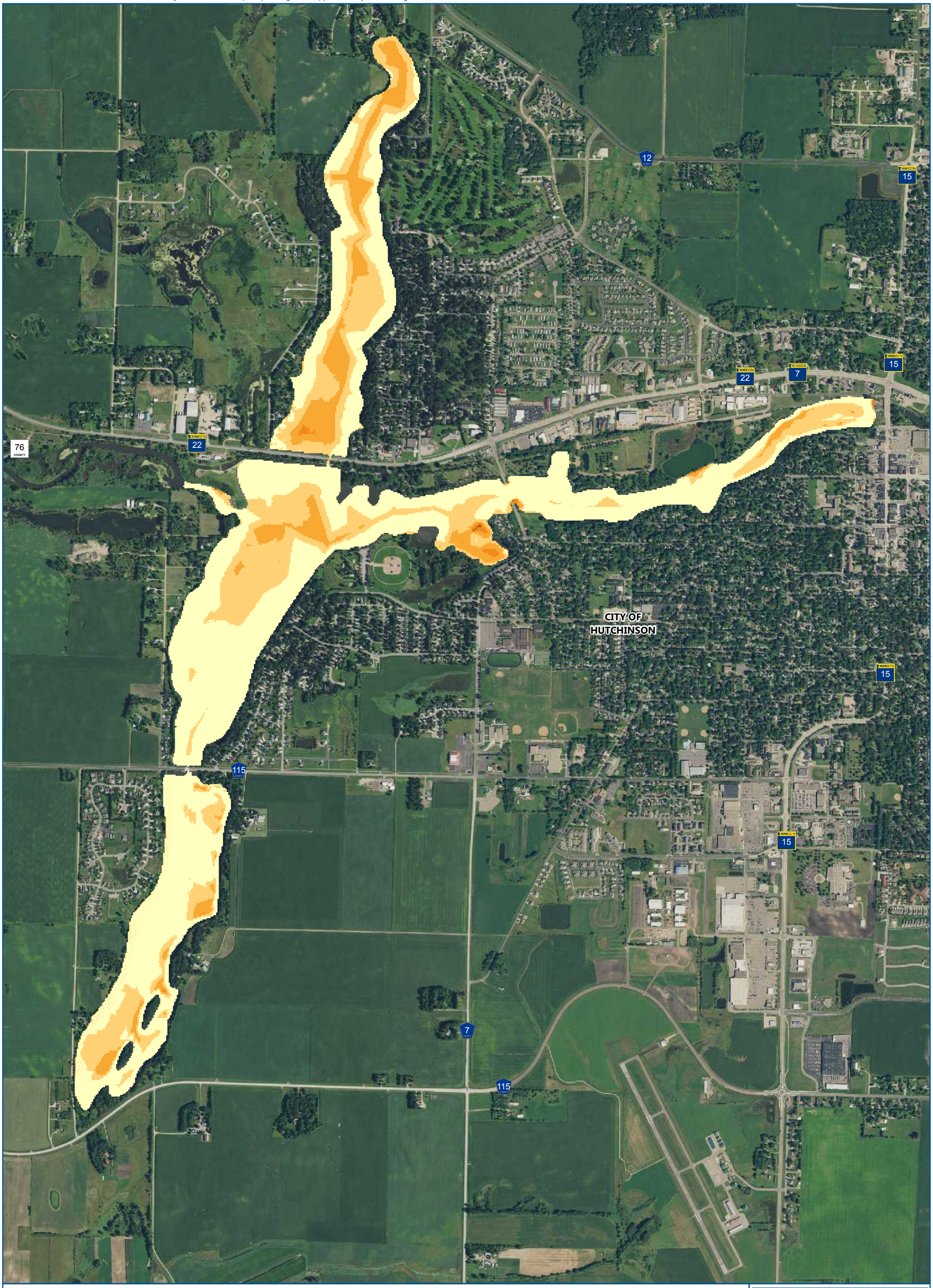
0 1,500 3,000

Feet

1976 BATHYMETRY
Otter and Campbell Lakes
Hutchinson, MN

FIGURE 4

Barr Footer: ArcGIS 10.4, 2017-10-25 14:22 File: I:\Projects\23\43\1008\Maps\Reports\Figure 5 - Apparent Bathymetric Change.mxd User: KAC2



Depth Change (1976 to 2017)

- 4 to 5 ft Shallower
- 3 to 4 ft Shallower
- 2 to 3 ft Shallower
- 1 to 2 ft Shallower
- 0 to 1 ft Shallower
- 0 ft (No Change in Depth)

N

0 1,500 3,000

Feet

BARR

APPARENT BATHYMETRIC CHANGE - 1976 TO 2017
Otter and Campbell Lakes
Hutchinson, MN

FIGURE 5

Appendices

Appendix A

Historical Aerial Photographs

Barr Footer: ArcGIS 10.4, 2017-10-02 12:55 File: I:\Projects\23\43\1008\Maps\Reports\Aerial Imagery\Figure 1 - 1955 Imagery.mxd User: KAC2

BARR

0 1,500 3,000

Feet

1955 IMAGERY
Otter Lake
Hutchinson, MN

Barr Footer: ArcGIS 10.4, 2017-10-02 12:55 File: I:\Projects\23\43\1008\Maps\Reports\Aerial Imagery\Figure 2 - 1975 Imagery.mxd User: KAC2

BARR

0 1,500 3,000

Feet

1955 IMAGERY
Otter Lake
Hutchinson, MN

Barr Footer: ArcGIS 10.4, 2017-10-02 12:55 File: I:\Projects\23\43\1008\Maps\Reports\Aerial Imagery\Figure 3 - 1991 Imagery.mxd User: KAC2

BARR

0 1,500 3,000

Feet

1991 IMAGERY
Otter Lake
Hutchinson, MN

Barr Footer: ArcGIS 10.4, 2017-10-02 12:55 File: I:\Projects\23\43\1008\Maps\Reports\Aerial Imagery\Figure 4 - 2002 Imagery.mxd User: KAC2

BARR

0 1,500 3,000

Feet

2002 IMAGERY
Otter Lake
Hutchinson, MN

Barr Footer: ArcGIS 10.4, 2017-10-02 12:55 File: I:\Projects\23\43\1008\Maps\Reports\Aerial Imagery\Figure 5 - 2003 Imagery.mxd User: KAC2

BARR

0 1,500 3,000

Feet

2003 IMAGERY
Otter Lake
Hutchinson, MN

Barr Footer: ArcGIS 10.4, 2017-10-02 12:56 File: I:\Projects\23\43\1008\Maps\Reports\Aerial Imagery\Figure 6 - 2006 Imagery.mxd User: KAC2

BARR

0 1,500 3,000

Feet

2006 IMAGERY
Otter Lake
Hutchinson, MN

Barr Footer: ArcGIS 10.4, 2017-10-02 12:56 File: I:\Projects\23\43\1008\Maps\Reports\Aerial Imagery\Figure 7 - 2008 Imagery.mxd User: KAC2

BARR

0 1,500 3,000

Feet

2008 IMAGERY
Otter Lake
Hutchinson, MN

Barr Footer: ArcGIS 10.4, 2017-10-02 12:56 File: I:\Projects\23\43\1008\Maps\Reports\Aerial Imagery\Figure 8 - 2009 Imagery.mxd User: KAC2

BARR

N

0 1,500 3,000

Feet

2009 IMAGERY
Otter Lake
Hutchinson, MN

Barr Footer: ArcGIS 10.4, 2017-10-02 12:56 File: I:\Projects\23\43\1008\Maps\Reports\Aerial Imagery\Figure 9 - 2010 Imagery.mxd User: KAC2

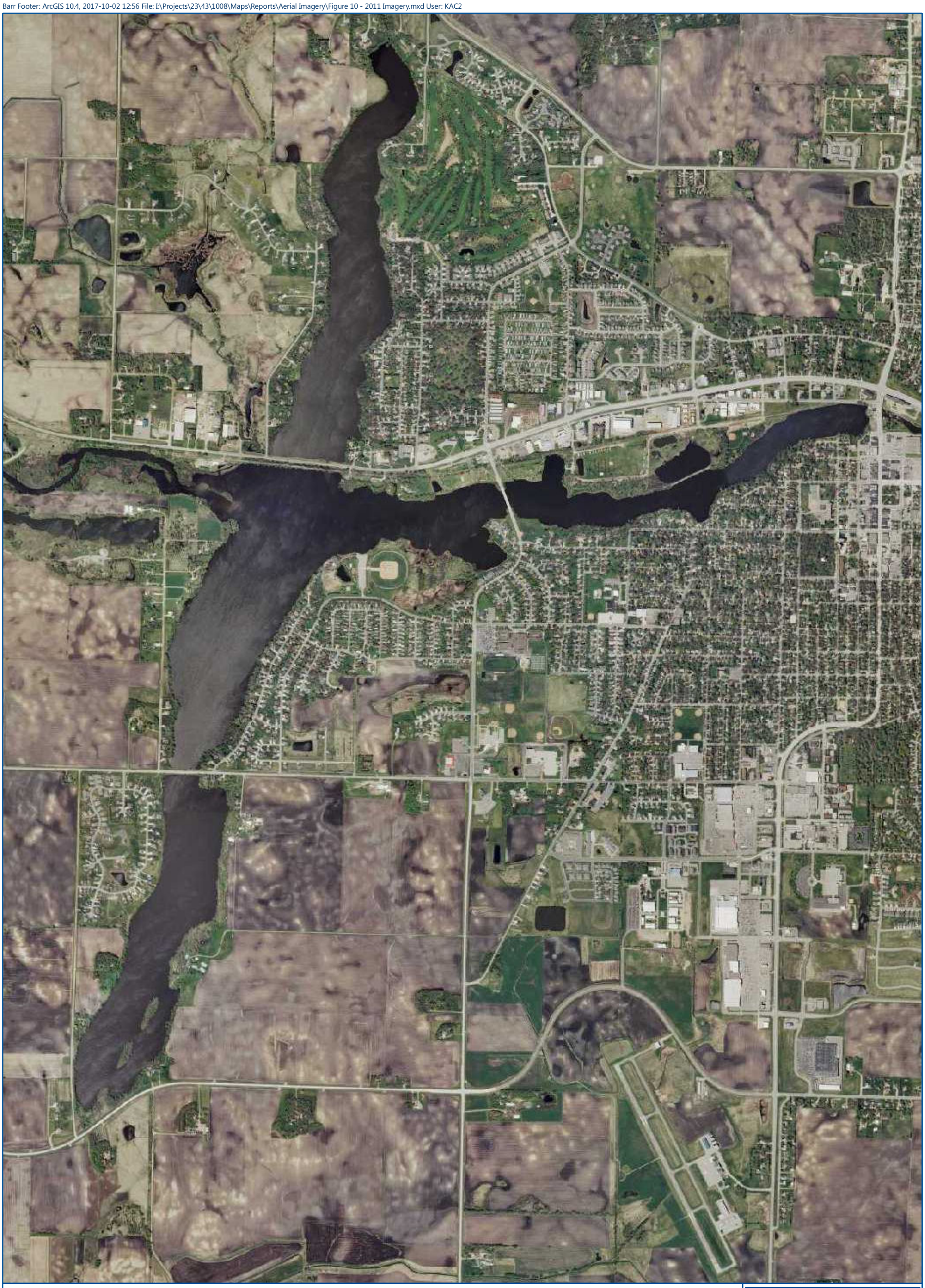
BARR

0 1,500 3,000

Feet

2010 IMAGERY
Otter Lake
Hutchinson, MN

Barr Footer: ArcGIS 10.4, 2017-10-02 12:56 File: I:\Projects\23\43\1008\Maps\Reports\Aerial Imagery\Figure 10 - 2011 Imagery.mxd User: KAC2



BARR

0 1,500 3,000

Feet

2011 IMAGERY
Otter Lake
Hutchinson, MN

Barr Footer: ArcGIS 10.4, 2017-10-02 12:56 File: I:\Projects\23\43\1008\Maps\Reports\Aerial Imagery\Figure 11 - 2013 Imagery.mxd User: KAC2

BARR

0 1,500 3,000

Feet

2013 IMAGERY
Otter Lake
Hutchinson, MN

Barr Footer: ArcGIS 10.4, 2017-10-02 12:56 File: I:\Projects\23\43\1008\Maps\Reports\Aerial Imagery\Figure 12 - 2014 Imagery.mxd User: KAC2

BARR

0 1,500 3,000

Feet

2014 IMAGERY
Otter Lake
Hutchinson, MN

Barr Footer: ArcGIS 10.4, 2017-10-02 12:55 File: I:\Projects\23\43\1008\Maps\Reports\Aerial Imagery\Figure 13 - 2015 Imagery.mxd User: KAC2

BARR

0 1,500 3,000

Feet

2015 IMAGERY
Otter Lake
Hutchinson, MN

Appendix B

Hutchinson Dam Functionality Update Memorandum

resourceful. naturally.
engineering and environmental consultants

BARR

Technical Memorandum

To: John Paulson and Kent Exner
From: Jon Ausdemore
Subject: Hutchinson Dam Functionality Update
Date: October 27, 2017
Project: Hutchinson Lakes/River Basin Improvement Study
c: Eric Hedblom

Hutchinson Dam was re-constructed in 2008 to provide a passive structure allowing the passage of fish and other aquatic species. The replacement dam is a rock riffle structure consisting of a series of stepped boulder weirs and a steel sheet pile wall at the upstream crest. The new dam replaced a concrete weir with 2 tainter gates, and was designed to maintain equal or lower upstream flood elevations for the 100-year event. To maintain the previous capacity of the dam, the new dam was pushed upstream to allow for a longer crest. Additionally, the dam was lowered approximately 6 inches to maintain flood levels for the 100-year event equal or below previous conditions.

The City of Hutchinson has received several questions regarding reduced pool elevations. The City has asked Barr to review the current structure to confirm the dam is functioning as intended. This memorandum documents our review.

1.0 Background

The dam constructed in 2008 consists of a steel sheet pile wall and a boulder weir to control the upstream pool elevation. The previous concrete dam had a crest elevation of 1038.5 and the current dam has a sheet pile wall constructed to elevation 1037.8 with boulders and rock placed slightly higher on both sides of the sheets. Since the rock is less efficient than the previous concrete dam at passing water, the dam was lowered to maintain flood elevations near the previous flood levels. The following table provides the estimated change in pool elevations between the previous dam and the existing dam for various flow events.

Table 1 - Estimated Pool Elevations

Flood Event	Lake Elevation (Old Dam)	Lake Elevation (Current Dam)	Lake Elevation Change (Current - Old)
100-year flood	1043.5	1043.5	0.0 feet
Normal Flow	1039.3	1038.8	-0.5 feet
Low Flow	1038.9	1038.6	-0.3 feet

As shown in the table above, the estimated upstream pool elevations for low flows and normal flows is 0.3 – 0.5 feet lower with the new dam. As flows increase, the difference is negated since the rock riffles have less efficiency and slow the water as it crosses the dam causing the pool elevation to increase. However, since the dam is a lower elevation, lower events have slightly lower pool elevations.

During construction of the current dam, several measures were taken to minimize seepage and maximize upstream pool elevations during low and normal flows. Figure 1 below shows the steel sheet pile weir in-place which serves as a fixed-crest weir. This sheet pile was installed to an elevation of 1037.8.

Figure 1 - Steel Sheet Pile Weir

After placement of the steel sheets, the boulder weir was placed on the downstream side and baserock was placed upstream to cover the sheets. Figure 2 below shows the boulder weir and baserock upstream of the sheets.

Figure 2 - Boulder Weir

The final step taken during construction to maintain upstream pool elevations was the placement of smaller "chinking" rock into the rock voids and the void between the sheets. This rock was placed under flow conditions allowing the contractor to strategically place the chinking rock in areas where water was being lost into the rock. Figure 3 below shows the contractor placing the chinking rock along the upstream boulder weir.

Figure 3 - Placement of Chinking Rock

2.0 2017 Review

Due to concerns the pool elevation is lower than what was planned during the original design, Barr was asked to review the dam's current function. Steps involved in our review included:

- Survey upstream boulders to compare with initial installed elevations with present day elevations
- Review of the upstream crest to confirm chinking rock remains in-place

Survey was completed by the City of Hutchinson. The table below shows a comparison of current elevations at specific locations verified post construct nearly 10 years ago along the upper boulder weir.

Table 2 - Boulder Weir Elevations

Location	As-built Elevations	2017 Elevations
1A	1042.0	1042.0
1B	1040.0	1040.0
1C	1038.3	1038.3
1D	1038.1	1038.1
1E	1038.3	1038.3
1F	1039.5	1039.5
1G	1042.0	1042.0

As shown in the table, elevations have not changed since original construction indicating the upper portion of the structure has not undergone any measurable settlement.

The upstream crest was visually inspected by Barr on September 14, 2017. At the time of the inspection, flows at the DNR gage in Hutchinson (located downstream of the dam) were approximately 130 cfs. The low flow condition at the dam has been estimated to be 50 cfs, and the normal flows are estimated to be 140 cfs. Flows at the dam are likely between low flow and normal flow conditions.

Figure 4 below shows water flowing over the top of the boulders for about 1/3 of the dam crest, with the majority of flow passing between the boulders. The low point in the boulders is measured to be 1038.1, and therefore, the upstream pool (at a location that is not influenced by the dam) is estimated to be 1038.3 – 1038.8. Predicted elevations for the flow conditions present on 9/14/2017 are between 1038.6 and 1038.8 indicating current pool elevations are near predicted pool elevations. It is estimated the pool elevation with the old dam would be between 1038.9 and 1039.3, which is about 6 inches higher than the current pool elevation.

Figure 4 - Conditions at the Crest on 9/14/2017

The visual inspection did verify chinking material upstream of the crest, specifically at the right abutment and the sheet pile between the boulders was not visible. It appears the original chinking upstream of the sheet pile has remained in-place and additional fine sediment and debris have further reduced the permeability below the boulders. However, very little chinking material was present between the boulders at elevations above the sheet pile allowing for flows to pass over the sheets but between boulders for lower flow events. This does not impact the original functionality of the dam, and in-fact, facilitates upstream fish passage. The original design did not factor in chinking between the boulders with the design elevations based upon the sheet pile and the boulders themselves. Chinking rock was placed in these gaps during the original construction with the understanding most of this rock would wash downstream into the baserock helping maintain the water on the surface of the ramp. Additional chinking rock can be added between these upstream boulders to potentially increase the upstream pool elevation during low-flow periods, however, higher flow events will most likely wash this smaller rock downstream.

3.0 Results and Recommendations

The following results were determined during our review of the current conditions of Hutchinson Dam.

- The survey completed by the City of Hutchinson in 2017 indicates no movement of settlement of the boulders at the upstream crest.
- Visual observations of the dam crest show water is flowing over the top of the sheet pile weir, and over the lower elevation boulders in the center of the dam as originally designed.
- Visual observations show chinking and low-permeable materials remain in-place upstream of the crest minimizing leakage through the dam, however, minimal chinking material is present in the boulder gaps allowing for water to flow around the boulders. This fits with the original design intent; however, during low-flow periods, placement of upstream chinking rock may help maintain a slightly higher pool elevation, but is at risk to wash downstream as flows over the spillway increase.

It is concluded the dam is functioning as originally designed. The estimated pool elevation is near levels estimated during the design.

No modifications to the dam are recommended, however, to make a definitive conclusion regarding actual pool elevations in relation to flow events and predicted elevations for those flow events, measured pool elevations are required. If the City wishes to further understand actual pool elevations in relation predicted elevations and to conditions with the old dam, it is recommended periodic measurements of the pool be performed and recorded with the corresponding flow at the downstream gage.

Appendix C

Boring Logs

Barr Engineering Company
4300 MarketPointe Drive Suite 200
Minneapolis, MN 55435
Telephone: 952-832-2600

LOG OF BORING 31

DRAFT

Project:Hutchinson
Project No.:23/43-1008
Location:Hutchinson, MN
Coordinates:
Datum:

Surface Elevation:
Drilling Method:Push Core
Sampling Method:Vibracore
Completion Depth:3.5 ft

Depth, feet	Sample Type & Recovery	Sample No.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0			**D/O/S:**None/ None/ None	OL/ OH		ORGANIC SILTS (OL/ OH): black; wet; soft; cohesive; non-plastic plasticity.	
0.5							
1.0		31 (0-2')					
1.5							
2.0			**D/O/S:**None/ None/ None	OL/ OH		ORGANIC SILTS (OL/ OH): black; wet; soft/spongy; cohesive, with leafy vegetation and shells (peaty); non-plastic plasticity.	
2.5							
3.0							
3.5						End of boring 3.5 feet No refusal, ran out of tube.	
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

Date Boring Started: 5/24/17
Date Boring Completed:
Logged By: JWJ
Drilling Contractor: Barr
Drill Rig:

Remarks:

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

Barr Engineering Company
4300 MarketPointe Drive Suite 200
Minneapolis, MN 55435
Telephone: 952-832-2600

LOG OF BORING 50

DRAFT

Project:Hutchinson
Project No.:23/43-1008
Location:Hutchinson, MN
Coordinates:
Datum:

Surface Elevation:
Drilling Method:
Sampling Method:Vibracore
Completion Depth:5.4 ft

Depth, feet	Sample Type & Recovery	Sample No.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0			**D/O/S:**None/ None/ None	OL/ OH		ORGANIC SILTS (OL/ OH): black; wet; soft; cohesive; non-plastic plasticity.	
0.5							
1.0							
1.5		50 (0-2.8')					
2.0							
2.5							
3.0			**D/O/S:**None/ None/ None	OL/ OH		ORGANIC SILTS (OL/ OH): very dark brown to black; soft/spongy; cohesive, with snails' shells (peaty); non-plastic plasticity.	
3.5							
4.0							
4.5							
5.0							
5.5						End of boring 5.4 feet Refusal at 5.4'.	
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

Date Boring Started:
Date Boring Completed:
Logged By:
Drilling Contractor: Barr
Drill Rig:

Remarks:

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

O:\GINT\PROJECTS\23431008 HUTCHINSON\23431008 HUTCHINSON.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

Barr Engineering Company
4300 MarketPointe Drive Suite 200
Minneapolis, MN 55435
Telephone: 952-832-2600

LOG OF BORING 62

DRAFT

Project:Hutchinson
Project No.:23/43-1008
Location:Hutchinson, MN
Coordinates:
Datum:

Surface Elevation:
Drilling Method:Vibracore
Sampling Method:Vibracore
Completion Depth:4.7 ft

Depth, feet	Sample Type & Recovery	Sample No.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0			**D/O/S:**None/ None/ None	OL/ OH		ORGANIC SILTS (OL/ OH): black; wet; soft; cohesive; non-plastic plasticity.	
0.5							
1.0		62 (0-1.7')					
1.5							
2.0			**D/O/S:**None/ None/ None	OL/ OH		ORGANIC SILTS (OL/ OH): black; wet; soft/spongy; cohesive, with shells and fibrous leafy material; non-plastic plasticity.	
2.5							
3.0		62 (1.7-4.4')					
3.5							
4.0			**D/O/S:**None/ None/ None	OL/ CL		ORGANIC LEAN CLAY (OL/ CL): black; wet; sticky; cohesive; low plasticity.	
4.5	K1					▽	
5.0						End of boring 4.7 feet Refusal at 4.7'.	
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

Date Boring Started: 5/23/17
Date Boring Completed:
Logged By: JWJ
Drilling Contractor: Barr
Drill Rig:

Remarks:

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

Barr Engineering Company
4300 MarketPointe Drive Suite 200
Minneapolis, MN 55435
Telephone: 952-832-2600

LOG OF BORING 72

DRAFT

Project:Hutchinson
Project No.:23/43-1008
Location:Hutchinson, MN
Coordinates:
Datum:

Surface Elevation:
Drilling Method:
Sampling Method:Vibracore
Completion Depth:3.8 ft

Depth, feet	Sample Type & Recovery	Sample No.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0			**D/O/S:**None/ None/ None	OL/ OH		ORGANIC SILTS (OL/ OH): wet; loose; cohesive; non-plastic plasticity.	
0.5			**D/O/S:**None/ None/ None			ORGANIC SILTS (OL/ OH): wet; soft; cohesive; low plasticity.	
1.0		72 (0-2')		OL/ OH			
1.5							
2.0			**D/O/S:**None/ None/ None			At 1.9', trace shells.	
2.5				OL/ OH		ORGANIC SILTS (OL/ OH): black; wet; soft; cohesive, with leafy (peaty) particles; low plasticity.	
3.0			**D/O/S:**None/ None/ None	CL/ OL		ORGANIC CLAY (CL/ OL): black; wet; sticky; cohesive; low plasticity.	
3.5							
4.0						End of boring 3.8 feet Refusal at 3.8'.	
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

Date Boring Started: 5/23/17
Date Boring Completed:
Logged By:
Drilling Contractor: Barr
Drill Rig:

Remarks:

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

O:\GINT\PROJECTS\23431008 HUTCHINSON\23431008 HUTCHINSON.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

Barr Engineering Company
4300 MarketPointe Drive Suite 200
Minneapolis, MN 55435
Telephone: 952-832-2600

LOG OF BORING 86

DRAFT

Project:Hutchinson
Project No.:23/43-1008
Location:Hutchinson, MN
Coordinates:
Datum:

Surface Elevation:
Drilling Method:Push Core
Sampling Method:Vibracore
Completion Depth:4.4 ft

Depth, feet	Sample Type & Recovery	Sample No.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0							
0.5		86 (0-1.5')	**D/O/S:**None/ None/ None	OL/ OH		ORGANIC SILTS (OL/ OH): black; wet; soft; cohesive; non-plastic plasticity.	
1.0							
1.5			**D/O/S:**None/ None/ None				
2.0				OL/ OH		ORGANIC SILTS (OL/ OH): black; wet; soft/spongy; cohesive, with leafy vegetation and shells (peaty); non-plastic plasticity.	
2.5							
3.0							
3.5							
4.0							
4.5						End of boring 4.4 feet No refusal, ran out of tube.	
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

Date Boring Started: 5/24/17
Date Boring Completed:
Logged By: JWJ
Drilling Contractor: Barr
Drill Rig:

Remarks:

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

Barr Engineering Company
4300 MarketPointe Drive Suite 200
Minneapolis, MN 55435
Telephone: 952-832-2600

LOG OF BORING 129

DRAFT

Project:Hutchinson
Project No.:23/43-1008
Location:Hutchinson, MN
Coordinates:
Datum:

Surface Elevation:
Drilling Method:Vibracore
Sampling Method:Vibracore
Completion Depth:6.0 ft

Depth, feet	Sample Type & Recovery	Sample No.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0			**D/O/S:**None/ None/ None	OL/ OH		ORGANIC SILTS (OL/ OH): black; wet; soft; cohesive; non-plastic plasticity.	
1.5		129 (0-3.4')					
2.0			**D/O/S:**None/ None/ None	OL/ OH		ORGANIC SILTS (OL/ OH): black; wet; soft; cohesive, with leafy vegetation particles; non-plastic plasticity.	
3.5			**D/O/S:**None/ None/ None	SP		POORLY GRADED SAND (SP): very fine grained; dark gray; wet; loose; with silt.	
4.0		129 (3.4-4.6')	**D/O/S:**None/ None/ None	SP		POORLY GRADED SAND (SP): very fine to coarse grained; dark gray; wet; loose; with fine gravel.	
6.0						End of boring 6.0 feet	
10.0							

Date Boring Started: 5/23/17
Date Boring Completed:
Logged By: JWJ
Drilling Contractor: Barr
Drill Rig:

Remarks:

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

O:\GINT\PROJECTS\23431008 HUTCHINSON\23431008 HUTCHINSON.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

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Minneapolis, MN 55435
Telephone: 952-832-2600

LOG OF BORING 142

DRAFT

Project:Hutchinson
Project No.:23/43-1008
Location:Hutchinson, MN
Coordinates:
Datum:

Surface Elevation:
Drilling Method:Vibracore
Sampling Method:Vibracore
Completion Depth:5.0 ft

Depth, feet	Sample Type & Recovery	Sample No.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0							
0.5		142 (0-1.8')	**D/O/S:**None/ None/ None	OL/ OH		ORGANIC SILTS (OL/ OH): black; wet; soft; cohesive; non-plastic plasticity.	
1.0							
1.5			**D/O/S:**None/ None/ None	OL/ OH		ORGANIC SILTS (OL/ OH): black; wet; soft; cohesive, with leaves, plants, and trace shells; non-plastic plasticity.	
2.0			**D/O/S:**None/ None/ None	OL/ CH		ORGANIC CLAY (OL/ CH): black; wet; sticky; cohesive; low plasticity.	
2.5							
3.0							
3.5							
4.0							
4.5							
5.0						End of boring 5.0 feet Refusal at 5.0'.	
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

Date Boring Started: 5/23/17
Date Boring Completed:
Logged By: JWJ
Drilling Contractor: Barr
Drill Rig:

Remarks:

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

O:\GINT\PROJECTS\23431008 HUTCHINSON\23431008 HUTCHINSON.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

Barr Engineering Company
4300 MarketPointe Drive Suite 200
Minneapolis, MN 55435
Telephone: 952-832-2600

LOG OF BORING 152

DRAFT

Project:Hutchinson
Project No.:23/43-1008
Location:Hutchinson, MN
Coordinates:
Datum:

Surface Elevation:
Drilling Method:Vibracore
Sampling Method:Vibracore
Completion Depth:2.2 ft

Depth, feet	Sample Type & Recovery	Sample No.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0							
0.5		152 (0-1.2')	**D/O/S:**None/ None/ None	OL/ OH		ORGANIC SILTS (OL/ OH): black; wet; soft; cohesive, with shells; non-plastic plasticity.	
1.0							
1.5			**D/O/S:**None/ None/ None	OL/ CL		ORGANIC CLAY (OL/ CL): black; wet; sticky; cohesive, with small shells; low plasticity.	
2.0							
2.5						End of boring 2.2 feet Refusal at 2.2'.	
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

Date Boring Started: 5/23/17
Date Boring Completed:
Logged By: JWJ
Drilling Contractor: Barr
Drill Rig:

Remarks:

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

Barr Engineering Company
4300 MarketPointe Drive Suite 200
Minneapolis, MN 55435
Telephone: 952-832-2600

LOG OF BORING 162

DRAFT

Project:Hutchinson
Project No.:23/43-1008
Location:Hutchinson, MN
Coordinates:
Datum:

Surface Elevation:
Drilling Method:Vibracore
Sampling Method:Vibracore
Completion Depth:2.5 ft

Depth, feet	Sample Type & Recovery	Sample No.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0							
0.5		162 (0-1.5')	**D/O/S:**None/ None/ None	OL/ OH		ORGANIC SILTS (OL/ OH): black; wet; soft; cohesive; non-plastic plasticity.	
1.0							
1.5			**D/O/S:**None/ None/ None	OL/ CL		ORGANIC CLAY (OL/ CL): black to very dark gray; wet; stiff; cohesive; low plasticity.	
2.0							
2.5						At 2.3', lense of olive blue green sand. End of boring 2.5 feet Refusal at 2.5'.	
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

Date Boring Started: 5/23/17
Date Boring Completed:
Logged By: JWJ
Drilling Contractor: Barr
Drill Rig:

Remarks:

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

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4300 MarketPointe Drive Suite 200
Minneapolis, MN 55435
Telephone: 952-832-2600

LOG OF BORING 178

DRAFT

Project:Hutchinson
Project No.:23/43-1008
Location:Hutchinson, MN
Coordinates:
Datum:

Surface Elevation:
Drilling Method:Vibracore
Sampling Method:Vibracore
Completion Depth:4.7 ft

Depth, feet	Sample Type & Recovery	Sample No.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0			**D/O/S:**None/ None/ None	OL/ OH		ORGANIC SILTS (OL/ OH): black; wet; soft; cohesive; non-plastic plasticity.	
0.5							
1.0		178 (0-2.5')					
1.5							
2.0			**D/O/S:**None/ None/ None	OL/ OH		ORGANIC SILTS (OL/ OH): black; wet; soft; cohesive, with leaves/plant material; non-plastic plasticity.	
2.5							
3.0			**D/O/S:**None/ None/ None	SP		POORLY GRADED SAND (SP): very fine grained; very dark gray; wet; loose; not cohesive; non-plastic plasticity.	
			D/O/S: None/ None/ None	OL/ CL		ORGANIC CLAY (OL/ CL): black; wet; sticky; cohesive; low plasticity.	
4.0							
4.5						End of boring 4.7 feet Refusal at 4.7'.	
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

Date Boring Started: 5/23/17
Date Boring Completed:
Logged By: JWJ
Drilling Contractor: Barr
Drill Rig:

Remarks:

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

Appendix D

Laboratory Reports (Pace Analytical)

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

June 09, 2017

John Paulson
City of Hutchinson
111 Hassan Street SE
Hutchinson, MN 55350

RE: Project: 19554
Pace Project No.: 10389923

Dear John Paulson:
Enclosed are the analytical results for sample(s) received by the laboratory on May 24, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Some analyses have been subcontracted outside of the Pace Network. The subcontracted laboratory report has been attached.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Amanda Albrecht
amanda.albrecht@pacelabs.com
(612)607-6382
Project Manager

Enclosures

cc: Mr. Randy Devries, City of Hutchinson WWTF
Ms. Marion Graham, City of Hutchinson
Terri Olson, Barr Engineering

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: 19554
Pace Project No.: 10389923

Minnesota Certification IDs

1700 Elm Street SE, Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: UST-078
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014
Arkansas Certification #: 88-0680
California Certification #: MN00064
CNMI Saipan Certification #:MP0003
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida Certification #: E87605
Georgia Certification #: 959
Guam EPA Certification #: MN00064
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: 03086
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064
Maryland Certification #: 322
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: MN00064
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081
New Jersey Certification #: MN002
New York Certification #: 11647
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon NwTPH Certification #: MN300001
Oregon Secondary Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia Certification #: 460163
Washington Certification #: C486
West Virginia DW Certification #: 9952 C
West Virginia WW Certification #: 382
Wisconsin Certification #: 999407970
Wyoming via EPA Region 8 Certification #: 8TMS-L

Virginia Minnesota Certification ID's

315 Chestnut Street, Virginia, MN 55792
Montana Certificate #CERT0103
California Certification #2973
California Certification #2973
Alaska Certification UST-107
Alaska Certification UST-107
Alaska Certification #MN01084
Arizona Department of Health Certification #AZ0785
Minnesota Dept of Health Certification #: 027-137-445
North Dakota Certification: # R-203
Wisconsin DNR Certification # : 998027470
WA Department of Ecology Lab ID# C1007
Nevada DNR #MN010842015-1
Oklahoma Department of Environmental Quality
California Certification #2973

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: 19554
Pace Project No.: 10389923

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10389923001	**Sed 50**	EPA 8082A	SNG	12	PASI-M
		EPA 6010C	DM	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		Trivalent Chromium Calculation	KEO	1	PASI-M
		EPA 350.1	DMB	1	PASI-V
		EPA 351.2	DMB	1	PASI-V
		EPA 353.2	DMB	1	PASI-V
		EPA 365.1	DMB	1	PASI-V
		EPA 9060A	CRE	4	PASI-V
10389923002	**Sed 62**	EPA 8082A	SNG	12	PASI-M
		EPA 6010C	DM	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		Trivalent Chromium Calculation	KEO	1	PASI-M
		EPA 350.1	DMB	1	PASI-V
		EPA 351.2	DMB	1	PASI-V
		EPA 353.2	DMB	1	PASI-V
		EPA 365.1	DMB	1	PASI-V
		EPA 9060A	CRE	4	PASI-V
10389923004	**Sed 72**	EPA 8082A	SNG	12	PASI-M
		EPA 6010C	DM	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		Trivalent Chromium Calculation	KEO	1	PASI-M
		EPA 350.1	DMB	1	PASI-V
		EPA 351.2	DMB	1	PASI-V
		EPA 353.2	DMB	1	PASI-V
		EPA 365.1	DMB	1	PASI-V
		EPA 9060A	CRE	4	PASI-V
10389923005	**Sed 129**	EPA 8082A	SNG	12	PASI-M
		EPA 6010C	DM	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		Trivalent Chromium Calculation	KEO	1	PASI-M
		EPA 350.1	DMB	1	PASI-V
		EPA 351.2	DMB	1	PASI-V

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: 19554
Pace Project No.: 10389923

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 353.2	DMB	1	PASI-V
		EPA 365.1	DMB	1	PASI-V
		EPA 9060A	CRE	4	PASI-V
10389923007	**Sed 142**	EPA 8082A	SNG	12	PASI-M
		EPA 6010C	DM	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		Trivalent Chromium Calculation	KEO	1	PASI-M
		EPA 350.1	DMB	1	PASI-V
		EPA 351.2	DMB	1	PASI-V
		EPA 353.2	DMB	1	PASI-V
		EPA 365.1	DMB	1	PASI-V
		EPA 9060A	CRE	4	PASI-V
10389923008	**Sed 152**	EPA 8082A	SNG	12	PASI-M
		EPA 6010C	DM	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		Trivalent Chromium Calculation	KEO	1	PASI-M
		EPA 350.1	DMB	1	PASI-V
		EPA 351.2	DMB	1	PASI-V
		EPA 353.2	DMB	1	PASI-V
		EPA 365.1	DMB	1	PASI-V
		EPA 9060A	CRE	4	PASI-V
10389923009	**Sed 162**	EPA 8082A	SNG	12	PASI-M
		EPA 6010C	DM	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		Trivalent Chromium Calculation	KEO	1	PASI-M
		EPA 350.1	DMB	1	PASI-V
		EPA 351.2	DMB	1	PASI-V
		EPA 353.2	DMB	1	PASI-V
		EPA 365.1	DMB	1	PASI-V
		EPA 9060A	CRE	4	PASI-V
10389923010	**Sed 178**	EPA 8082A	SNG	12	PASI-M
		EPA 6010C	DM	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: 19554
Pace Project No.: 10389923

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		Trivalent Chromium Calculation	KEO	1	PASI-M
		EPA 350.1	DMB	1	PASI-V
		EPA 351.2	DMB	1	PASI-V
		EPA 353.2	DMB	1	PASI-V
		EPA 365.1	DMB	1	PASI-V
		EPA 9060A	CRE	4	PASI-V

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389923

Sample: Sed 50 **Lab ID: 10389923001** Collected: 05/23/17 11:12 Received: 05/24/17 09:19 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8082A GCS PCB	Analytical Method: EPA 8082A Preparation Method: EPA 3550							
PCB-1016 (Aroclor 1016)	ND	ug/kg	98.9	1	05/31/17 09:02	06/02/17 13:06	12674-11-2	
PCB-1221 (Aroclor 1221)	ND	ug/kg	98.9	1	05/31/17 09:02	06/02/17 13:06	11104-28-2	
PCB-1232 (Aroclor 1232)	ND	ug/kg	98.9	1	05/31/17 09:02	06/02/17 13:06	11141-16-5	
PCB-1242 (Aroclor 1242)	ND	ug/kg	98.9	1	05/31/17 09:02	06/02/17 13:06	53469-21-9	
PCB-1248 (Aroclor 1248)	ND	ug/kg	98.9	1	05/31/17 09:02	06/02/17 13:06	12672-29-6	
PCB-1254 (Aroclor 1254)	ND	ug/kg	98.9	1	05/31/17 09:02	06/02/17 13:06	11097-69-1	
PCB-1260 (Aroclor 1260)	ND	ug/kg	98.9	1	05/31/17 09:02	06/02/17 13:06	11096-82-5	
PCB-1262 (Aroclor 1262)	ND	ug/kg	98.9	1	05/31/17 09:02	06/02/17 13:06	37324-23-5	
PCB-1268 (Aroclor 1268)	ND	ug/kg	98.9	1	05/31/17 09:02	06/02/17 13:06	11100-14-4	
PCB, Total	ND	ug/kg	98.9	1	05/31/17 09:02	06/02/17 13:06	1336-36-3	
Surrogates								
Tetrachloro-m-xylene (S)	97	%.	41-135	1	05/31/17 09:02	06/02/17 13:06	877-09-8	
Decachlorobiphenyl (S)	93	%.	45-144	1	05/31/17 09:02	06/02/17 13:06	2051-24-3	
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050							
Arsenic	**9.2**	mg/kg	2.9	1	05/25/17 09:06	05/30/17 08:53	7440-38-2	
Cadmium	**0.51**	mg/kg	0.44	1	05/25/17 09:06	05/30/17 08:53	7440-43-9	
Chromium	**22.2**	mg/kg	1.5	1	05/25/17 09:06	05/30/17 08:53	7440-47-3	
Copper	**21.5**	mg/kg	1.5	1	05/25/17 09:06	05/30/17 08:53	7440-50-8	
Lead	**15.4**	mg/kg	1.5	1	05/25/17 09:06	05/30/17 08:53	7439-92-1	
Nickel	**21.4**	mg/kg	2.9	1	05/25/17 09:06	05/30/17 08:53	7440-02-0	
Selenium	ND	mg/kg	2.9	1	05/25/17 09:06	05/30/17 08:53	7782-49-2	
Zinc	**90.8**	mg/kg	2.9	1	05/25/17 09:06	05/30/17 08:53	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	**0.14**	mg/kg	0.055	1	05/25/17 10:08	05/31/17 14:45	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**66.6**	%	0.10	1		05/30/17 14:36		
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation							
Chromium, Trivalent	**22.2**	mg/kg	1.0	1		06/08/17 09:10		
350.1 Ammonia	Analytical Method: EPA 350.1 Preparation Method: EPA 350.1							
Nitrogen, Ammonia	**484**	mg/kg	9.0	1	06/06/17 09:30	06/07/17 13:52	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2							
Nitrogen, Kjeldahl, Total	**5460**	mg/kg	150	1	06/06/17 09:28	06/07/17 08:43	7727-37-9	
353.2 Nitrogen, NO2/NO3	Analytical Method: EPA 353.2 Preparation Method: EPA 353.2							
Nitrogen, NO2 plus NO3	ND	mg/kg	3.0	1	06/08/17 15:15	06/09/17 10:40		N2
365.1 Phosphorus, Total	Analytical Method: EPA 365.1 Preparation Method: SM 4500P B							
Phosphorus	**612**	mg/kg	7.5	1	06/01/17 13:28	06/02/17 12:55	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389923

Sample: Sed 50 **Lab ID: 10389923001** Collected: 05/23/17 11:12 Received: 05/24/17 09:19 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Total Organic Carbon	Analytical Method: EPA 9060A							
RPD%	**0.80**	%		1		05/31/17 10:33		
Total Organic Carbon	**62700**	mg/kg	4350	1		05/31/17 10:25	7440-44-0	
Total Organic Carbon	**62200**	mg/kg	4550	1		05/31/17 10:33	7440-44-0	
Mean Total Organic Carbon	**62400**	mg/kg	4450	1		05/31/17 10:33	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
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(612)607-1700

ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389923

Sample: Sed 62 **Lab ID: 10389923002** Collected: 05/23/17 11:55 Received: 05/24/17 09:19 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8082A GCS PCB	Analytical Method: EPA 8082A Preparation Method: EPA 3550							
PCB-1016 (Aroclor 1016)	ND	ug/kg	83.4	1	05/31/17 09:02	06/02/17 13:22	12674-11-2	
PCB-1221 (Aroclor 1221)	ND	ug/kg	83.4	1	05/31/17 09:02	06/02/17 13:22	11104-28-2	
PCB-1232 (Aroclor 1232)	ND	ug/kg	83.4	1	05/31/17 09:02	06/02/17 13:22	11141-16-5	
PCB-1242 (Aroclor 1242)	ND	ug/kg	83.4	1	05/31/17 09:02	06/02/17 13:22	53469-21-9	
PCB-1248 (Aroclor 1248)	ND	ug/kg	83.4	1	05/31/17 09:02	06/02/17 13:22	12672-29-6	
PCB-1254 (Aroclor 1254)	ND	ug/kg	83.4	1	05/31/17 09:02	06/02/17 13:22	11097-69-1	
PCB-1260 (Aroclor 1260)	ND	ug/kg	83.4	1	05/31/17 09:02	06/02/17 13:22	11096-82-5	
PCB-1262 (Aroclor 1262)	ND	ug/kg	83.4	1	05/31/17 09:02	06/02/17 13:22	37324-23-5	
PCB-1268 (Aroclor 1268)	ND	ug/kg	83.4	1	05/31/17 09:02	06/02/17 13:22	11100-14-4	
PCB, Total	ND	ug/kg	83.4	1	05/31/17 09:02	06/02/17 13:22	1336-36-3	
Surrogates								
Tetrachloro-m-xylene (S)	91	%.	41-135	1	05/31/17 09:02	06/02/17 13:22	877-09-8	
Decachlorobiphenyl (S)	89	%.	45-144	1	05/31/17 09:02	06/02/17 13:22	2051-24-3	
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050							
Arsenic	**6.7**	mg/kg	2.5	1	05/25/17 09:06	05/30/17 09:21	7440-38-2	
Cadmium	**0.44**	mg/kg	0.37	1	05/25/17 09:06	05/30/17 09:21	7440-43-9	
Chromium	**17.8**	mg/kg	1.2	1	05/25/17 09:06	05/30/17 09:21	7440-47-3	
Copper	**17.2**	mg/kg	1.2	1	05/25/17 09:06	05/30/17 09:21	7440-50-8	
Lead	**11.6**	mg/kg	1.2	1	05/25/17 09:06	05/30/17 09:21	7439-92-1	
Nickel	**16.6**	mg/kg	2.5	1	05/25/17 09:06	05/30/17 09:21	7440-02-0	
Selenium	ND	mg/kg	2.5	1	05/25/17 09:06	05/30/17 09:21	7782-49-2	
Zinc	**72.9**	mg/kg	2.5	1	05/25/17 09:06	05/30/17 09:21	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	**0.11**	mg/kg	0.048	1	05/25/17 10:08	05/31/17 14:47	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**60.6**	%	0.10	1		05/30/17 14:37		
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation							
Chromium, Trivalent	**17.8**	mg/kg	1.0	1		06/08/17 09:10		
350.1 Ammonia	Analytical Method: EPA 350.1 Preparation Method: EPA 350.1							
Nitrogen, Ammonia	**151**	mg/kg	7.6	1	06/06/17 09:30	06/07/17 14:00	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2							
Nitrogen, Kjeldahl, Total	**2710**	mg/kg	127	1	06/06/17 09:28	06/07/17 08:44	7727-37-9	
353.2 Nitrogen, NO2/NO3	Analytical Method: EPA 353.2 Preparation Method: EPA 353.2							
Nitrogen, NO2 plus NO3	ND	mg/kg	2.5	1	06/08/17 15:15	06/09/17 10:42		N2
365.1 Phosphorus, Total	Analytical Method: EPA 365.1 Preparation Method: SM 4500P B							
Phosphorus	**552**	mg/kg	6.3	1	06/01/17 13:28	06/02/17 12:56	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389923

Sample: Sed 62 **Lab ID: 10389923002** Collected: 05/23/17 11:55 Received: 05/24/17 09:19 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Total Organic Carbon	Analytical Method: EPA 9060A							
RPD%	**1.1**	%		1		05/31/17 10:48		
Total Organic Carbon	**37800**	mg/kg	4960	1		05/31/17 10:40	7440-44-0	
Total Organic Carbon	**38200**	mg/kg	3930	1		05/31/17 10:48	7440-44-0	
Mean Total Organic Carbon	**38000**	mg/kg	4440	1		05/31/17 10:48	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
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ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389923

Sample: Sed 72 **Lab ID: 10389923004** Collected: 05/23/17 12:44 Received: 05/24/17 09:19 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8082A GCS PCB	Analytical Method: EPA 8082A Preparation Method: EPA 3550							
PCB-1016 (Aroclor 1016)	ND	ug/kg	64.2	1	05/31/17 09:02	06/02/17 13:38	12674-11-2	
PCB-1221 (Aroclor 1221)	ND	ug/kg	64.2	1	05/31/17 09:02	06/02/17 13:38	11104-28-2	
PCB-1232 (Aroclor 1232)	ND	ug/kg	64.2	1	05/31/17 09:02	06/02/17 13:38	11141-16-5	
PCB-1242 (Aroclor 1242)	ND	ug/kg	64.2	1	05/31/17 09:02	06/02/17 13:38	53469-21-9	
PCB-1248 (Aroclor 1248)	ND	ug/kg	64.2	1	05/31/17 09:02	06/02/17 13:38	12672-29-6	
PCB-1254 (Aroclor 1254)	ND	ug/kg	64.2	1	05/31/17 09:02	06/02/17 13:38	11097-69-1	
PCB-1260 (Aroclor 1260)	ND	ug/kg	64.2	1	05/31/17 09:02	06/02/17 13:38	11096-82-5	
PCB-1262 (Aroclor 1262)	ND	ug/kg	64.2	1	05/31/17 09:02	06/02/17 13:38	37324-23-5	
PCB-1268 (Aroclor 1268)	ND	ug/kg	64.2	1	05/31/17 09:02	06/02/17 13:38	11100-14-4	
PCB, Total	ND	ug/kg	64.2	1	05/31/17 09:02	06/02/17 13:38	1336-36-3	
Surrogates								
Tetrachloro-m-xylene (S)	91	%.	41-135	1	05/31/17 09:02	06/02/17 13:38	877-09-8	
Decachlorobiphenyl (S)	89	%.	45-144	1	05/31/17 09:02	06/02/17 13:38	2051-24-3	
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050							
Arsenic	**5.8**	mg/kg	1.9	1	05/25/17 09:06	05/30/17 09:25	7440-38-2	
Cadmium	**0.39**	mg/kg	0.29	1	05/25/17 09:06	05/30/17 09:25	7440-43-9	
Chromium	**14.4**	mg/kg	0.97	1	05/25/17 09:06	05/30/17 09:25	7440-47-3	
Copper	**15.1**	mg/kg	0.97	1	05/25/17 09:06	05/30/17 09:25	7440-50-8	
Lead	**10**	mg/kg	0.97	1	05/25/17 09:06	05/30/17 09:25	7439-92-1	
Nickel	**14.6**	mg/kg	1.9	1	05/25/17 09:06	05/30/17 09:25	7440-02-0	
Selenium	ND	mg/kg	1.9	1	05/25/17 09:06	05/30/17 09:25	7782-49-2	
Zinc	**63.1**	mg/kg	1.9	1	05/25/17 09:06	05/30/17 09:25	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	**0.10**	mg/kg	0.038	1	05/25/17 10:08	05/31/17 14:53	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**48.7**	%	0.10	1		05/30/17 14:37		
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation							
Chromium, Trivalent	**14.4**	mg/kg	1.0	1		06/08/17 09:10		
350.1 Ammonia	Analytical Method: EPA 350.1 Preparation Method: EPA 350.1							
Nitrogen, Ammonia	**176**	mg/kg	5.8	1	06/06/17 09:30	06/07/17 14:01	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2							
Nitrogen, Kjeldahl, Total	**2750**	mg/kg	97.4	1	06/06/17 09:28	06/07/17 08:45	7727-37-9	
353.2 Nitrogen, NO2/NO3	Analytical Method: EPA 353.2 Preparation Method: EPA 353.2							
Nitrogen, NO2 plus NO3	ND	mg/kg	1.9	1	06/08/17 15:15	06/09/17 10:43		N2
365.1 Phosphorus, Total	Analytical Method: EPA 365.1 Preparation Method: SM 4500P B							
Phosphorus	**485**	mg/kg	4.9	1	06/01/17 13:28	06/02/17 12:57	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389923

Sample: Sed 72 **Lab ID: 10389923004** Collected: 05/23/17 12:44 Received: 05/24/17 09:19 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Total Organic Carbon	Analytical Method: EPA 9060A							
RPD%	**1.8**	%		1		05/31/17 11:04		
Total Organic Carbon	**40500**	mg/kg	2910	1		05/31/17 10:57	7440-44-0	
Total Organic Carbon	**41300**	mg/kg	2560	1		05/31/17 11:04	7440-44-0	
Mean Total Organic Carbon	**40900**	mg/kg	2730	1		05/31/17 11:04	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389923

Sample: Sed 129 **Lab ID: 10389923005** Collected: 05/23/17 13:36 Received: 05/24/17 09:19 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8082A GCS PCB	Analytical Method: EPA 8082A Preparation Method: EPA 3550							
PCB-1016 (Aroclor 1016)	ND	ug/kg	63.1	1	05/31/17 09:02	06/02/17 13:53	12674-11-2	
PCB-1221 (Aroclor 1221)	ND	ug/kg	63.1	1	05/31/17 09:02	06/02/17 13:53	11104-28-2	
PCB-1232 (Aroclor 1232)	ND	ug/kg	63.1	1	05/31/17 09:02	06/02/17 13:53	11141-16-5	
PCB-1242 (Aroclor 1242)	ND	ug/kg	63.1	1	05/31/17 09:02	06/02/17 13:53	53469-21-9	
PCB-1248 (Aroclor 1248)	ND	ug/kg	63.1	1	05/31/17 09:02	06/02/17 13:53	12672-29-6	
PCB-1254 (Aroclor 1254)	ND	ug/kg	63.1	1	05/31/17 09:02	06/02/17 13:53	11097-69-1	
PCB-1260 (Aroclor 1260)	ND	ug/kg	63.1	1	05/31/17 09:02	06/02/17 13:53	11096-82-5	
PCB-1262 (Aroclor 1262)	ND	ug/kg	63.1	1	05/31/17 09:02	06/02/17 13:53	37324-23-5	
PCB-1268 (Aroclor 1268)	ND	ug/kg	63.1	1	05/31/17 09:02	06/02/17 13:53	11100-14-4	
PCB, Total	ND	ug/kg	63.1	1	05/31/17 09:02	06/02/17 13:53	1336-36-3	
Surrogates								
Tetrachloro-m-xylene (S)	87	%.	41-135	1	05/31/17 09:02	06/02/17 13:53	877-09-8	
Decachlorobiphenyl (S)	89	%.	45-144	1	05/31/17 09:02	06/02/17 13:53	2051-24-3	
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050							
Arsenic	**4.1**	mg/kg	1.8	1	05/25/17 09:06	05/30/17 09:29	7440-38-2	
Cadmium	ND	mg/kg	0.27	1	05/25/17 09:06	05/30/17 09:29	7440-43-9	
Chromium	**13.3**	mg/kg	0.89	1	05/25/17 09:06	05/30/17 09:29	7440-47-3	
Copper	**11.5**	mg/kg	0.89	1	05/25/17 09:06	05/30/17 09:29	7440-50-8	
Lead	**7.9**	mg/kg	0.89	1	05/25/17 09:06	05/30/17 09:29	7439-92-1	
Nickel	**12.0**	mg/kg	1.8	1	05/25/17 09:06	05/30/17 09:29	7440-02-0	
Selenium	ND	mg/kg	1.8	1	05/25/17 09:06	05/30/17 09:29	7782-49-2	
Zinc	**52.7**	mg/kg	1.8	1	05/25/17 09:06	05/30/17 09:29	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	**0.059**	mg/kg	0.036	1	05/25/17 10:08	05/31/17 14:55	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**47.8**	%	0.10	1		05/30/17 14:37		
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation							
Chromium, Trivalent	**13.3**	mg/kg	1.0	1		06/08/17 09:10		
350.1 Ammonia	Analytical Method: EPA 350.1 Preparation Method: EPA 350.1							
Nitrogen, Ammonia	**229**	mg/kg	5.7	1	06/06/17 09:30	06/07/17 14:02	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2							
Nitrogen, Kjeldahl, Total	**2360**	mg/kg	95.8	1	06/06/17 09:28	06/07/17 08:46	7727-37-9	
353.2 Nitrogen, NO2/NO3	Analytical Method: EPA 353.2 Preparation Method: EPA 353.2							
Nitrogen, NO2 plus NO3	ND	mg/kg	1.9	1	06/08/17 15:15	06/09/17 10:45		N2
365.1 Phosphorus, Total	Analytical Method: EPA 365.1 Preparation Method: SM 4500P B							
Phosphorus	**457**	mg/kg	4.8	1	06/01/17 13:28	06/02/17 12:58	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389923

Sample: Sed 129 **Lab ID: 10389923005** Collected: 05/23/17 13:36 Received: 05/24/17 09:19 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Total Organic Carbon	Analytical Method: EPA 9060A							
RPD%	**0.58**	%		1		05/31/17 11:19		
Total Organic Carbon	**36300**	mg/kg	3380	1		05/31/17 11:11	7440-44-0	
Total Organic Carbon	**36500**	mg/kg	3410	1		05/31/17 11:19	7440-44-0	
Mean Total Organic Carbon	**36400**	mg/kg	3400	1		05/31/17 11:19	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389923

Sample: Sed 142 **Lab ID: 10389923007** Collected: 05/23/17 14:15 Received: 05/24/17 09:19 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8082A GCS PCB	Analytical Method: EPA 8082A Preparation Method: EPA 3550							
PCB-1016 (Aroclor 1016)	ND	ug/kg	76.3	1	05/31/17 09:02	06/02/17 14:09	12674-11-2	
PCB-1221 (Aroclor 1221)	ND	ug/kg	76.3	1	05/31/17 09:02	06/02/17 14:09	11104-28-2	
PCB-1232 (Aroclor 1232)	ND	ug/kg	76.3	1	05/31/17 09:02	06/02/17 14:09	11141-16-5	
PCB-1242 (Aroclor 1242)	ND	ug/kg	76.3	1	05/31/17 09:02	06/02/17 14:09	53469-21-9	
PCB-1248 (Aroclor 1248)	ND	ug/kg	76.3	1	05/31/17 09:02	06/02/17 14:09	12672-29-6	
PCB-1254 (Aroclor 1254)	ND	ug/kg	76.3	1	05/31/17 09:02	06/02/17 14:09	11097-69-1	
PCB-1260 (Aroclor 1260)	ND	ug/kg	76.3	1	05/31/17 09:02	06/02/17 14:09	11096-82-5	
PCB-1262 (Aroclor 1262)	ND	ug/kg	76.3	1	05/31/17 09:02	06/02/17 14:09	37324-23-5	
PCB-1268 (Aroclor 1268)	ND	ug/kg	76.3	1	05/31/17 09:02	06/02/17 14:09	11100-14-4	
PCB, Total	ND	ug/kg	76.3	1	05/31/17 09:02	06/02/17 14:09	1336-36-3	
Surrogates								
Tetrachloro-m-xylene (S)	93	%.	41-135	1	05/31/17 09:02	06/02/17 14:09	877-09-8	
Decachlorobiphenyl (S)	87	%.	45-144	1	05/31/17 09:02	06/02/17 14:09	2051-24-3	
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050							
Arsenic	**7.9**	mg/kg	2.2	1	05/25/17 09:06	05/30/17 09:33	7440-38-2	
Cadmium	**0.50**	mg/kg	0.33	1	05/25/17 09:06	05/30/17 09:33	7440-43-9	
Chromium	**18.3**	mg/kg	1.1	1	05/25/17 09:06	05/30/17 09:33	7440-47-3	
Copper	**23.1**	mg/kg	1.1	1	05/25/17 09:06	05/30/17 09:33	7440-50-8	
Lead	**33.1**	mg/kg	1.1	1	05/25/17 09:06	05/30/17 09:33	7439-92-1	
Nickel	**17.7**	mg/kg	2.2	1	05/25/17 09:06	05/30/17 09:33	7440-02-0	
Selenium	ND	mg/kg	2.2	1	05/25/17 09:06	05/30/17 09:33	7782-49-2	
Zinc	**107**	mg/kg	2.2	1	05/25/17 09:06	05/30/17 09:33	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	**0.12**	mg/kg	0.040	1	05/25/17 10:08	05/31/17 14:57	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**56.8**	%	0.10	1		05/30/17 14:37		
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation							
Chromium, Trivalent	**18.3**	mg/kg	1.0	1		06/08/17 09:10		
350.1 Ammonia	Analytical Method: EPA 350.1 Preparation Method: EPA 350.1							
Nitrogen, Ammonia	**357**	mg/kg	6.9	1	06/06/17 09:30	06/07/17 14:03	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2							
Nitrogen, Kjeldahl, Total	**3780**	mg/kg	116	1	06/06/17 09:28	06/07/17 08:48	7727-37-9	
353.2 Nitrogen, NO2/NO3	Analytical Method: EPA 353.2 Preparation Method: EPA 353.2							
Nitrogen, NO2 plus NO3	ND	mg/kg	2.3	1	06/08/17 15:15	06/09/17 10:46		N2
365.1 Phosphorus, Total	Analytical Method: EPA 365.1 Preparation Method: SM 4500P B							
Phosphorus	**635**	mg/kg	11.6	2	06/01/17 13:28	06/02/17 13:19	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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(612)607-1700

ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389923

Sample: Sed 142 **Lab ID: 10389923007** Collected: 05/23/17 14:15 Received: 05/24/17 09:19 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Total Organic Carbon	Analytical Method: EPA 9060A							
RPD%	**4.1**	%		1		05/31/17 12:13		
Total Organic Carbon	**72300**	mg/kg	3920	1		05/31/17 12:06	7440-44-0	
Total Organic Carbon	**75400**	mg/kg	4070	1		05/31/17 12:13	7440-44-0	
Mean Total Organic Carbon	**73900**	mg/kg	3990	1		05/31/17 12:13	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389923

Sample: Sed 152 **Lab ID: 10389923008** Collected: 05/23/17 14:53 Received: 05/24/17 09:19 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8082A GCS PCB	Analytical Method: EPA 8082A Preparation Method: EPA 3550							
PCB-1016 (Aroclor 1016)	ND	ug/kg	73.3	1	05/31/17 09:02	06/02/17 14:57	12674-11-2	
PCB-1221 (Aroclor 1221)	ND	ug/kg	73.3	1	05/31/17 09:02	06/02/17 14:57	11104-28-2	
PCB-1232 (Aroclor 1232)	ND	ug/kg	73.3	1	05/31/17 09:02	06/02/17 14:57	11141-16-5	
PCB-1242 (Aroclor 1242)	ND	ug/kg	73.3	1	05/31/17 09:02	06/02/17 14:57	53469-21-9	
PCB-1248 (Aroclor 1248)	ND	ug/kg	73.3	1	05/31/17 09:02	06/02/17 14:57	12672-29-6	
PCB-1254 (Aroclor 1254)	ND	ug/kg	73.3	1	05/31/17 09:02	06/02/17 14:57	11097-69-1	
PCB-1260 (Aroclor 1260)	ND	ug/kg	73.3	1	05/31/17 09:02	06/02/17 14:57	11096-82-5	
PCB-1262 (Aroclor 1262)	ND	ug/kg	73.3	1	05/31/17 09:02	06/02/17 14:57	37324-23-5	
PCB-1268 (Aroclor 1268)	ND	ug/kg	73.3	1	05/31/17 09:02	06/02/17 14:57	11100-14-4	
PCB, Total	ND	ug/kg	73.3	1	05/31/17 09:02	06/02/17 14:57	1336-36-3	
Surrogates								
Tetrachloro-m-xylene (S)	96	%.	41-135	1	05/31/17 09:02	06/02/17 14:57	877-09-8	
Decachlorobiphenyl (S)	93	%.	45-144	1	05/31/17 09:02	06/02/17 14:57	2051-24-3	
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050							
Arsenic	**7.3**	mg/kg	2.2	1	05/25/17 09:06	05/30/17 09:37	7440-38-2	
Cadmium	ND	mg/kg	0.32	1	05/25/17 09:06	05/30/17 09:37	7440-43-9	
Chromium	**8.1**	mg/kg	1.1	1	05/25/17 09:06	05/30/17 09:37	7440-47-3	
Copper	**10.7**	mg/kg	1.1	1	05/25/17 09:06	05/30/17 09:37	7440-50-8	
Lead	**6.1**	mg/kg	1.1	1	05/25/17 09:06	05/30/17 09:37	7439-92-1	
Nickel	**10.8**	mg/kg	2.2	1	05/25/17 09:06	05/30/17 09:37	7440-02-0	
Selenium	ND	mg/kg	2.2	1	05/25/17 09:06	05/30/17 09:37	7782-49-2	
Zinc	**37.6**	mg/kg	2.2	1	05/25/17 09:06	05/30/17 09:37	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	**0.045**	mg/kg	0.039	1	05/25/17 10:08	05/31/17 14:59	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**55.0**	%	0.10	1		05/30/17 15:41		
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation							
Chromium, Trivalent	**8.1**	mg/kg	1.0	1		06/08/17 09:10		
350.1 Ammonia	Analytical Method: EPA 350.1 Preparation Method: EPA 350.1							
Nitrogen, Ammonia	**184**	mg/kg	6.7	1	06/06/17 09:30	06/07/17 14:04	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2							
Nitrogen, Kjeldahl, Total	**4400**	mg/kg	111	1	06/06/17 09:28	06/07/17 08:52	7727-37-9	M1
353.2 Nitrogen, NO2/NO3	Analytical Method: EPA 353.2 Preparation Method: EPA 353.2							
Nitrogen, NO2 plus NO3	ND	mg/kg	2.2	1	06/08/17 15:15	06/09/17 10:47		N2
365.1 Phosphorus, Total	Analytical Method: EPA 365.1 Preparation Method: SM 4500P B							
Phosphorus	**902**	mg/kg	27.8	5	06/01/17 13:28	06/02/17 13:20	7723-14-0	P6

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389923

Sample: Sed 152 **Lab ID: 10389923008** Collected: 05/23/17 14:53 Received: 05/24/17 09:19 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Total Organic Carbon	Analytical Method: EPA 9060A							
RPD%	**5.7**	%		1		05/31/17 12:28		
Total Organic Carbon	**37800**	mg/kg	3430	1		05/31/17 12:20	7440-44-0	
Total Organic Carbon	**40100**	mg/kg	3190	1		05/31/17 12:28	7440-44-0	
Mean Total Organic Carbon	**38900**	mg/kg	3310	1		05/31/17 12:28	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389923

Sample: Sed 162 **Lab ID: 10389923009** Collected: 05/23/17 15:31 Received: 05/24/17 09:19 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8082A GCS PCB	Analytical Method: EPA 8082A Preparation Method: EPA 3550							
PCB-1016 (Aroclor 1016)	ND	ug/kg	57.3	1	05/31/17 09:02	06/02/17 15:13	12674-11-2	
PCB-1221 (Aroclor 1221)	ND	ug/kg	57.3	1	05/31/17 09:02	06/02/17 15:13	11104-28-2	
PCB-1232 (Aroclor 1232)	ND	ug/kg	57.3	1	05/31/17 09:02	06/02/17 15:13	11141-16-5	
PCB-1242 (Aroclor 1242)	ND	ug/kg	57.3	1	05/31/17 09:02	06/02/17 15:13	53469-21-9	
PCB-1248 (Aroclor 1248)	ND	ug/kg	57.3	1	05/31/17 09:02	06/02/17 15:13	12672-29-6	
PCB-1254 (Aroclor 1254)	ND	ug/kg	57.3	1	05/31/17 09:02	06/02/17 15:13	11097-69-1	
PCB-1260 (Aroclor 1260)	ND	ug/kg	57.3	1	05/31/17 09:02	06/02/17 15:13	11096-82-5	
PCB-1262 (Aroclor 1262)	ND	ug/kg	57.3	1	05/31/17 09:02	06/02/17 15:13	37324-23-5	
PCB-1268 (Aroclor 1268)	ND	ug/kg	57.3	1	05/31/17 09:02	06/02/17 15:13	11100-14-4	
PCB, Total	ND	ug/kg	57.3	1	05/31/17 09:02	06/02/17 15:13	1336-36-3	
Surrogates								
Tetrachloro-m-xylene (S)	103	%.	41-135	1	05/31/17 09:02	06/02/17 15:13	877-09-8	
Decachlorobiphenyl (S)	100	%.	45-144	1	05/31/17 09:02	06/02/17 15:13	2051-24-3	
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050							
Arsenic	**4.8**	mg/kg	1.7	1	05/25/17 09:06	05/30/17 09:41	7440-38-2	
Cadmium	**0.26**	mg/kg	0.25	1	05/25/17 09:06	05/30/17 09:41	7440-43-9	
Chromium	**12.5**	mg/kg	0.84	1	05/25/17 09:06	05/30/17 09:41	7440-47-3	
Copper	**11.3**	mg/kg	0.84	1	05/25/17 09:06	05/30/17 09:41	7440-50-8	
Lead	**8.0**	mg/kg	0.84	1	05/25/17 09:06	05/30/17 09:41	7439-92-1	
Nickel	**12.2**	mg/kg	1.7	1	05/25/17 09:06	05/30/17 09:41	7440-02-0	
Selenium	ND	mg/kg	1.7	1	05/25/17 09:06	05/30/17 09:41	7782-49-2	
Zinc	**44.4**	mg/kg	1.7	1	05/25/17 09:06	05/30/17 09:41	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	**0.045**	mg/kg	0.035	1	05/25/17 10:08	05/31/17 15:01	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**42.7**	%	0.10	1		05/30/17 15:42		
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation							
Chromium, Trivalent	**12.5**	mg/kg	1.0	1		06/08/17 09:10		
350.1 Ammonia	Analytical Method: EPA 350.1 Preparation Method: EPA 350.1							
Nitrogen, Ammonia	**123**	mg/kg	5.2	1	06/06/17 09:30	06/07/17 14:05	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2							
Nitrogen, Kjeldahl, Total	**2060**	mg/kg	87.2	1	06/06/17 09:28	06/07/17 09:00	7727-37-9	
353.2 Nitrogen, NO2/NO3	Analytical Method: EPA 353.2 Preparation Method: EPA 353.2							
Nitrogen, NO2 plus NO3	ND	mg/kg	1.7	1	06/08/17 15:15	06/09/17 10:49		N2
365.1 Phosphorus, Total	Analytical Method: EPA 365.1 Preparation Method: SM 4500P B							
Phosphorus	**305**	mg/kg	4.4	1	06/01/17 13:28	06/02/17 13:03	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389923

Sample: Sed 162 **Lab ID: 10389923009** Collected: 05/23/17 15:31 Received: 05/24/17 09:19 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Total Organic Carbon	Analytical Method: EPA 9060A							
RPD%	**1.9**	%		1		05/31/17 12:43		
Total Organic Carbon	**36100**	mg/kg	3170	1		05/31/17 12:35	7440-44-0	
Total Organic Carbon	**36800**	mg/kg	3070	1		05/31/17 12:43	7440-44-0	
Mean Total Organic Carbon	**36500**	mg/kg	3120	1		05/31/17 12:43	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389923

Sample: Sed 178 **Lab ID: 10389923010** Collected: 05/23/17 16:09 Received: 05/24/17 09:19 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8082A GCS PCB	Analytical Method: EPA 8082A Preparation Method: EPA 3550							
PCB-1016 (Aroclor 1016)	ND	ug/kg	87.7	1	05/31/17 09:02	06/02/17 15:29	12674-11-2	
PCB-1221 (Aroclor 1221)	ND	ug/kg	87.7	1	05/31/17 09:02	06/02/17 15:29	11104-28-2	
PCB-1232 (Aroclor 1232)	ND	ug/kg	87.7	1	05/31/17 09:02	06/02/17 15:29	11141-16-5	
PCB-1242 (Aroclor 1242)	ND	ug/kg	87.7	1	05/31/17 09:02	06/02/17 15:29	53469-21-9	
PCB-1248 (Aroclor 1248)	ND	ug/kg	87.7	1	05/31/17 09:02	06/02/17 15:29	12672-29-6	
PCB-1254 (Aroclor 1254)	ND	ug/kg	87.7	1	05/31/17 09:02	06/02/17 15:29	11097-69-1	
PCB-1260 (Aroclor 1260)	ND	ug/kg	87.7	1	05/31/17 09:02	06/02/17 15:29	11096-82-5	
PCB-1262 (Aroclor 1262)	ND	ug/kg	87.7	1	05/31/17 09:02	06/02/17 15:29	37324-23-5	
PCB-1268 (Aroclor 1268)	ND	ug/kg	87.7	1	05/31/17 09:02	06/02/17 15:29	11100-14-4	
PCB, Total	ND	ug/kg	87.7	1	05/31/17 09:02	06/02/17 15:29	1336-36-3	
Surrogates								
Tetrachloro-m-xylene (S)	94	%.	41-135	1	05/31/17 09:02	06/02/17 15:29	877-09-8	
Decachlorobiphenyl (S)	90	%.	45-144	1	05/31/17 09:02	06/02/17 15:29	2051-24-3	
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050							
Arsenic	**6.4**	mg/kg	2.5	1	05/25/17 09:06	05/30/17 09:45	7440-38-2	
Cadmium	**0.43**	mg/kg	0.37	1	05/25/17 09:06	05/30/17 09:45	7440-43-9	
Chromium	**17.3**	mg/kg	1.2	1	05/25/17 09:06	05/30/17 09:45	7440-47-3	
Copper	**18.5**	mg/kg	1.2	1	05/25/17 09:06	05/30/17 09:45	7440-50-8	
Lead	**14.2**	mg/kg	1.2	1	05/25/17 09:06	05/30/17 09:45	7439-92-1	
Nickel	**17.1**	mg/kg	2.5	1	05/25/17 09:06	05/30/17 09:45	7440-02-0	
Selenium	ND	mg/kg	2.5	1	05/25/17 09:06	05/30/17 09:45	7782-49-2	
Zinc	**78.0**	mg/kg	2.5	1	05/25/17 09:06	05/30/17 09:45	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	**0.092**	mg/kg	0.050	1	05/25/17 10:08	05/31/17 15:03	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**62.4**	%	0.10	1		05/30/17 15:42		
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation							
Chromium, Trivalent	**17.3**	mg/kg	1.0	1		06/08/17 09:10		
350.1 Ammonia	Analytical Method: EPA 350.1 Preparation Method: EPA 350.1							
Nitrogen, Ammonia	**231**	mg/kg	8.0	1	06/06/17 09:30	06/07/17 14:06	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2							
Nitrogen, Kjeldahl, Total	**4040**	mg/kg	133	1	06/06/17 09:28	06/07/17 09:01	7727-37-9	
353.2 Nitrogen, NO2/NO3	Analytical Method: EPA 353.2 Preparation Method: EPA 353.2							
Nitrogen, NO2 plus NO3	ND	mg/kg	2.7	1	06/08/17 15:15	06/09/17 10:50		N2
365.1 Phosphorus, Total	Analytical Method: EPA 365.1 Preparation Method: SM 4500P B							
Phosphorus	**488**	mg/kg	6.7	1	06/01/17 13:28	06/02/17 13:07	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
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ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389923

Sample: Sed 178 **Lab ID: 10389923010** Collected: 05/23/17 16:09 Received: 05/24/17 09:19 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Total Organic Carbon	Analytical Method: EPA 9060A							
RPD%	**4.4**	%		1		05/31/17 12:58		
Total Organic Carbon	**55600**	mg/kg	3570	1		05/31/17 12:50	7440-44-0	
Total Organic Carbon	**58100**	mg/kg	3170	1		05/31/17 12:58	7440-44-0	
Mean Total Organic Carbon	**56900**	mg/kg	3370	1		05/31/17 12:58	7440-44-0	

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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389923

QC Batch: 476107 Analysis Method: EPA 7471B
QC Batch Method: EPA 7471B Analysis Description: 7471B Mercury Solids
Associated Lab Samples: 10389923001, 10389923002, 10389923004, 10389923005, 10389923007, 10389923008, 10389923009, 10389923010

METHOD BLANK: 2595595 Matrix: Solid
Associated Lab Samples: 10389923001, 10389923002, 10389923004, 10389923005, 10389923007, 10389923008, 10389923009, 10389923010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	ND	0.019	05/31/17 14:10	

LABORATORY CONTROL SAMPLE: 2595596

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	.5	0.49	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2595597 2595598

Parameter	Units	10389977002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Mercury	mg/kg	19.7	.61	.63	25.9	40.4	1010	3270	75-125	44	M6,R1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389923

QC Batch: 476099 Analysis Method: EPA 6010C
QC Batch Method: EPA 3050 Analysis Description: 6010C Solids
Associated Lab Samples: 10389923001, 10389923002, 10389923004, 10389923005, 10389923007, 10389923008, 10389923009, 10389923010

METHOD BLANK: 2595561 Matrix: Solid
Associated Lab Samples: 10389923001, 10389923002, 10389923004, 10389923005, 10389923007, 10389923008, 10389923009, 10389923010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	ND	1.0	05/30/17 08:45	
Cadmium	mg/kg	ND	0.15	05/30/17 08:45	
Chromium	mg/kg	ND	0.50	05/30/17 08:45	
Copper	mg/kg	ND	0.50	05/30/17 08:45	
Lead	mg/kg	ND	0.50	05/30/17 08:45	
Nickel	mg/kg	ND	1.0	05/30/17 08:45	
Selenium	mg/kg	ND	1.0	05/30/17 08:45	
Zinc	mg/kg	ND	1.0	05/30/17 08:45	

LABORATORY CONTROL SAMPLE: 2595562

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	47.6	50.1	105	80-120	
Cadmium	mg/kg	47.6	48.1	101	80-120	
Chromium	mg/kg	47.6	47.8	100	80-120	
Copper	mg/kg	47.6	48.6	102	80-120	
Lead	mg/kg	47.6	50.5	106	80-120	
Nickel	mg/kg	47.6	48.6	102	80-120	
Selenium	mg/kg	47.6	49.5	104	80-120	
Zinc	mg/kg	47.6	51.7	109	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2595563 2595564

Parameter	Units	10389923001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Arsenic	mg/kg	9.2	150	141	159	149	100	99	75-125	7	
Cadmium	mg/kg	0.51	150	141	144	134	96	95	75-125	7	
Chromium	mg/kg	22.2	150	141	170	157	98	96	75-125	7	
Copper	mg/kg	21.5	150	141	168	157	98	96	75-125	7	
Lead	mg/kg	15.4	150	141	159	149	96	94	75-125	7	
Nickel	mg/kg	21.4	150	141	160	150	93	91	75-125	7	
Selenium	mg/kg	ND	150	141	146	139	97	97	75-125	5	
Zinc	mg/kg	90.8	150	141	246	230	103	98	75-125	7	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389923

QC Batch: 476728 Analysis Method: ASTM D2974
QC Batch Method: ASTM D2974 Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 10389923001, 10389923002, 10389923004, 10389923005, 10389923007

SAMPLE DUPLICATE: 2599004

Parameter	Units	10390410001 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	8.7	8.8	1	

SAMPLE DUPLICATE: 2599005

Parameter	Units	10389923007 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	56.8	56.9	0	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389923

QC Batch: 476766 Analysis Method: ASTM D2974
QC Batch Method: ASTM D2974 Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 10389923008, 10389923009, 10389923010

SAMPLE DUPLICATE: 2599200

Parameter	Units	10389966002 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	16.8	14.6	14	

SAMPLE DUPLICATE: 2599237

Parameter	Units	10389923008 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	55.0	52.6	4	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389923

QC Batch: 476949 Analysis Method: EPA 8082A
QC Batch Method: EPA 3550 Analysis Description: 8082A GCS PCB
Associated Lab Samples: 10389923001, 10389923002, 10389923004, 10389923005, 10389923007, 10389923008, 10389923009, 10389923010

METHOD BLANK: 2599709 Matrix: Solid
Associated Lab Samples: 10389923001, 10389923002, 10389923004, 10389923005, 10389923007, 10389923008, 10389923009, 10389923010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
PCB-1016 (Aroclor 1016)	ug/kg	ND	33.0	06/02/17 09:40	
PCB-1221 (Aroclor 1221)	ug/kg	ND	33.0	06/02/17 09:40	
PCB-1232 (Aroclor 1232)	ug/kg	ND	33.0	06/02/17 09:40	
PCB-1242 (Aroclor 1242)	ug/kg	ND	33.0	06/02/17 09:40	
PCB-1248 (Aroclor 1248)	ug/kg	ND	33.0	06/02/17 09:40	
PCB-1254 (Aroclor 1254)	ug/kg	ND	33.0	06/02/17 09:40	
PCB-1260 (Aroclor 1260)	ug/kg	ND	33.0	06/02/17 09:40	
PCB-1262 (Aroclor 1262)	ug/kg	ND	33.0	06/02/17 09:40	
PCB-1268 (Aroclor 1268)	ug/kg	ND	33.0	06/02/17 09:40	
Decachlorobiphenyl (S)	%.	93	45-144	06/02/17 09:40	
Tetrachloro-m-xylene (S)	%.	99	41-135	06/02/17 09:40	

LABORATORY CONTROL SAMPLE: 2599710

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
PCB-1016 (Aroclor 1016)	ug/kg	667	658	99	57-125	
PCB-1260 (Aroclor 1260)	ug/kg	667	631	95	57-125	
Decachlorobiphenyl (S)	%.			97	45-144	
Tetrachloro-m-xylene (S)	%.			103	41-135	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2599812 2599813

Parameter	Units	10390164005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
PCB-1016 (Aroclor 1016)	ug/kg	ND	719	718	691	696	96	97	33-125	1	
PCB-1260 (Aroclor 1260)	ug/kg	ND	719	718	668	658	93	92	37-125	1	
Decachlorobiphenyl (S)	%.						94	95	45-144		
Tetrachloro-m-xylene (S)	%.						98	99	41-135		

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389923

QC Batch: 115562 Analysis Method: EPA 350.1
QC Batch Method: EPA 350.1 Analysis Description: 350.1 Ammonia
Associated Lab Samples: 10389923001, 10389923002, 10389923004, 10389923005, 10389923007, 10389923008, 10389923009, 10389923010

METHOD BLANK: 455700 Matrix: Solid
Associated Lab Samples: 10389923001, 10389923002, 10389923004, 10389923005, 10389923007, 10389923008, 10389923009, 10389923010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Ammonia	mg/kg	ND	3.0	06/07/17 13:51	

LABORATORY CONTROL SAMPLE: 455699

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/kg	300	296	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 455701 455702

Parameter	Units	10389923001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrogen, Ammonia	mg/kg	484	899	899	1480	1380	110	100	90-110	7	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 455703 455704

Parameter	Units	10390324001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrogen, Ammonia	mg/kg	ND	483	483	492	486	101	100	90-110	1	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389923

QC Batch: 115556 Analysis Method: EPA 351.2
QC Batch Method: EPA 351.2 Analysis Description: 351.2 TKN
Associated Lab Samples: 10389923001, 10389923002, 10389923004, 10389923005, 10389923007

METHOD BLANK: 455684 Matrix: Solid
Associated Lab Samples: 10389923001, 10389923002, 10389923004, 10389923005, 10389923007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Kjeldahl, Total	mg/kg	ND	50.0	06/07/17 08:08	

LABORATORY CONTROL SAMPLE: 455683

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/kg	1000	982	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 455685 455686

Parameter	Units	1288182029 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrogen, Kjeldahl, Total	mg/kg	286	1300	1300	1530	1530	96	96	90-110	0	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 455687 455688

Parameter	Units	1288182039 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrogen, Kjeldahl, Total	mg/kg	1970	1230	1230	3210	3210	101	101	90-110	0	E

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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389923

QC Batch: 115557 Analysis Method: EPA 351.2
QC Batch Method: EPA 351.2 Analysis Description: 351.2 TKN
Associated Lab Samples: 10389923008, 10389923009, 10389923010

METHOD BLANK: 455690 Matrix: Solid
Associated Lab Samples: 10389923008, 10389923009, 10389923010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Kjeldahl, Total	mg/kg	ND	50.0	06/07/17 08:50	

LABORATORY CONTROL SAMPLE: 455689

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/kg	1000	981	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 455691 455692

Parameter	Units	10389923008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrogen, Kjeldahl, Total	mg/kg	4400	2220	2220	5910	5930	68	69	90-110	0	E,M1

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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389923

QC Batch: 115893 Analysis Method: EPA 353.2
QC Batch Method: EPA 353.2 Analysis Description: 353.2 Nitrate + Nitrite
Associated Lab Samples: 10389923001, 10389923002, 10389923004, 10389923005, 10389923007, 10389923008, 10389923009, 10389923010

METHOD BLANK: 457377 Matrix: Solid
Associated Lab Samples: 10389923001, 10389923002, 10389923004, 10389923005, 10389923007, 10389923008, 10389923009, 10389923010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/kg	ND	1.0	06/09/17 10:28	N2

LABORATORY CONTROL SAMPLE: 457376

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/kg	20	20.3	102	90-110	N2

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 457378 457379

Parameter	Units	10389947001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrogen, NO2 plus NO3	mg/kg	ND	75.2	75.5	70.7	71.1	90	91	90-110	1	N2

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 457381 457382

Parameter	Units	10389923010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrogen, NO2 plus NO3	mg/kg	ND	52.9	53.2	51.2	51.1	93	92	90-110	0	N2

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389923

QC Batch: 115240 Analysis Method: EPA 365.1
QC Batch Method: SM 4500P B Analysis Description: 365.1 Phosphorus, Total
Associated Lab Samples: 10389923001, 10389923002, 10389923004, 10389923005, 10389923007, 10389923008, 10389923009, 10389923010

METHOD BLANK: 454559 Matrix: Solid
Associated Lab Samples: 10389923001, 10389923002, 10389923004, 10389923005, 10389923007, 10389923008, 10389923009, 10389923010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Phosphorus	mg/kg	ND	2.5	06/02/17 12:45	

LABORATORY CONTROL SAMPLE: 454558

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/kg	25	25.5	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 454560 454561

Parameter	Units	10390324001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Phosphorus	mg/kg	1960	40.3	40.3	2300	2270	860	780	90-110	1	P6

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 454562 454563

Parameter	Units	10389923008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Phosphorus	mg/kg	902	55.5	55.5	694	697	-375	-370	90-110	0	P6,R1

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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389923

QC Batch: 114962 Analysis Method: EPA 9060A
QC Batch Method: EPA 9060A Analysis Description: 9060 TOC Average
Associated Lab Samples: 10389923001, 10389923002, 10389923004, 10389923005, 10389923007, 10389923008, 10389923009, 10389923010

METHOD BLANK: 453675 Matrix: Solid
Associated Lab Samples: 10389923001, 10389923002, 10389923004, 10389923005, 10389923007, 10389923008, 10389923009, 10389923010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/kg	ND	300	05/31/17 09:02	

LABORATORY CONTROL SAMPLE: 453676

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mean Total Organic Carbon	mg/kg	5820	4610	79	49-151	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 453677 453678

Parameter	Units	10389947001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Mean Total Organic Carbon	mg/kg	73300	57600	56700	138000	137000	112	113	70-130	1	

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QUALIFIERS

Project: 19554
Pace Project No.: 10389923

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis
PASI-V	Pace Analytical Services - Virginia

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
N2	The lab does not hold NELAC/TNI accreditation for this parameter.
P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 19554
Pace Project No.: 10389923

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10389923001	**Sed 50**	EPA 3550	476949	EPA 8082A	477510
10389923002	**Sed 62**	EPA 3550	476949	EPA 8082A	477510
10389923004	**Sed 72**	EPA 3550	476949	EPA 8082A	477510
10389923005	**Sed 129**	EPA 3550	476949	EPA 8082A	477510
10389923007	**Sed 142**	EPA 3550	476949	EPA 8082A	477510
10389923008	**Sed 152**	EPA 3550	476949	EPA 8082A	477510
10389923009	**Sed 162**	EPA 3550	476949	EPA 8082A	477510
10389923010	**Sed 178**	EPA 3550	476949	EPA 8082A	477510
10389923001	**Sed 50**	EPA 3050	476099	EPA 6010C	476493
10389923002	**Sed 62**	EPA 3050	476099	EPA 6010C	476493
10389923004	**Sed 72**	EPA 3050	476099	EPA 6010C	476493
10389923005	**Sed 129**	EPA 3050	476099	EPA 6010C	476493
10389923007	**Sed 142**	EPA 3050	476099	EPA 6010C	476493
10389923008	**Sed 152**	EPA 3050	476099	EPA 6010C	476493
10389923009	**Sed 162**	EPA 3050	476099	EPA 6010C	476493
10389923010	**Sed 178**	EPA 3050	476099	EPA 6010C	476493
10389923001	**Sed 50**	EPA 7471B	476107	EPA 7471B	476781
10389923002	**Sed 62**	EPA 7471B	476107	EPA 7471B	476781
10389923004	**Sed 72**	EPA 7471B	476107	EPA 7471B	476781
10389923005	**Sed 129**	EPA 7471B	476107	EPA 7471B	476781
10389923007	**Sed 142**	EPA 7471B	476107	EPA 7471B	476781
10389923008	**Sed 152**	EPA 7471B	476107	EPA 7471B	476781
10389923009	**Sed 162**	EPA 7471B	476107	EPA 7471B	476781
10389923010	**Sed 178**	EPA 7471B	476107	EPA 7471B	476781
10389923001	**Sed 50**	ASTM D2974	476728		
10389923002	**Sed 62**	ASTM D2974	476728		
10389923004	**Sed 72**	ASTM D2974	476728		
10389923005	**Sed 129**	ASTM D2974	476728		
10389923007	**Sed 142**	ASTM D2974	476728		
10389923008	**Sed 152**	ASTM D2974	476766		
10389923009	**Sed 162**	ASTM D2974	476766		
10389923010	**Sed 178**	ASTM D2974	476766		
10389923001	**Sed 50**	ASTM D422	476796		
10389923002	**Sed 62**	ASTM D422	476796		
10389923003	**Sed 62 B**	ASTM D422	476796		
10389923004	**Sed 72**	ASTM D422	476796		
10389923005	**Sed 129**	ASTM D422	476796		
10389923006	**Sed 129 B**	ASTM D422	476796		
10389923007	**Sed 142**	ASTM D422	476796		
10389923008	**Sed 152**	ASTM D422	476796		
10389923009	**Sed 162**	ASTM D422	476796		
10389923010	**Sed 178**	ASTM D422	476796		
10389923001	**Sed 50**	Trivalent Chromium Calculation	478580		
10389923002	**Sed 62**	Trivalent Chromium Calculation	478580		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 19554
Pace Project No.: 10389923

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10389923004	**Sed 72**	Trivalent Chromium Calculation	478580		
10389923005	**Sed 129**	Trivalent Chromium Calculation	478580		
10389923007	**Sed 142**	Trivalent Chromium Calculation	478580		
10389923008	**Sed 152**	Trivalent Chromium Calculation	478580		
10389923009	**Sed 162**	Trivalent Chromium Calculation	478580		
10389923010	**Sed 178**	Trivalent Chromium Calculation	478580		
10389923001	**Sed 50**	EPA 350.1	115562	EPA 350.1	115855
10389923002	**Sed 62**	EPA 350.1	115562	EPA 350.1	115855
10389923004	**Sed 72**	EPA 350.1	115562	EPA 350.1	115855
10389923005	**Sed 129**	EPA 350.1	115562	EPA 350.1	115855
10389923007	**Sed 142**	EPA 350.1	115562	EPA 350.1	115855
10389923008	**Sed 152**	EPA 350.1	115562	EPA 350.1	115855
10389923009	**Sed 162**	EPA 350.1	115562	EPA 350.1	115855
10389923010	**Sed 178**	EPA 350.1	115562	EPA 350.1	115855
10389923001	**Sed 50**	EPA 351.2	115556	EPA 351.2	115572
10389923002	**Sed 62**	EPA 351.2	115556	EPA 351.2	115572
10389923004	**Sed 72**	EPA 351.2	115556	EPA 351.2	115572
10389923005	**Sed 129**	EPA 351.2	115556	EPA 351.2	115572
10389923007	**Sed 142**	EPA 351.2	115556	EPA 351.2	115572
10389923008	**Sed 152**	EPA 351.2	115557	EPA 351.2	115571
10389923009	**Sed 162**	EPA 351.2	115557	EPA 351.2	115571
10389923010	**Sed 178**	EPA 351.2	115557	EPA 351.2	115571
10389923001	**Sed 50**	EPA 353.2	115893	EPA 353.2	115982
10389923002	**Sed 62**	EPA 353.2	115893	EPA 353.2	115982
10389923004	**Sed 72**	EPA 353.2	115893	EPA 353.2	115982
10389923005	**Sed 129**	EPA 353.2	115893	EPA 353.2	115982
10389923007	**Sed 142**	EPA 353.2	115893	EPA 353.2	115982
10389923008	**Sed 152**	EPA 353.2	115893	EPA 353.2	115982
10389923009	**Sed 162**	EPA 353.2	115893	EPA 353.2	115982
10389923010	**Sed 178**	EPA 353.2	115893	EPA 353.2	115982
10389923001	**Sed 50**	SM 4500P B	115240	EPA 365.1	115426
10389923002	**Sed 62**	SM 4500P B	115240	EPA 365.1	115426
10389923004	**Sed 72**	SM 4500P B	115240	EPA 365.1	115426
10389923005	**Sed 129**	SM 4500P B	115240	EPA 365.1	115426
10389923007	**Sed 142**	SM 4500P B	115240	EPA 365.1	115426
10389923008	**Sed 152**	SM 4500P B	115240	EPA 365.1	115426
10389923009	**Sed 162**	SM 4500P B	115240	EPA 365.1	115426
10389923010	**Sed 178**	SM 4500P B	115240	EPA 365.1	115426
10389923001	**Sed 50**	EPA 9060A	114962		
10389923001	**Sed 50**	EPA 9060A	114963		
10389923002	**Sed 62**	EPA 9060A	114962		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 19554
Pace Project No.: 10389923

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10389923002	**Sed 62**	EPA 9060A	114963		
10389923004	**Sed 72**	EPA 9060A	114962		
10389923004	**Sed 72**	EPA 9060A	114963		
10389923005	**Sed 129**	EPA 9060A	114962		
10389923005	**Sed 129**	EPA 9060A	114963		
10389923007	**Sed 142**	EPA 9060A	114962		
10389923007	**Sed 142**	EPA 9060A	114963		
10389923008	**Sed 152**	EPA 9060A	114962		
10389923008	**Sed 152**	EPA 9060A	114963		
10389923009	**Sed 162**	EPA 9060A	114962		
10389923009	**Sed 162**	EPA 9060A	114963		
10389923010	**Sed 178**	EPA 9060A	114962		
10389923010	**Sed 178**	EPA 9060A	114963		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10389923

Page: 1 of 1

Section A Required Client Information:

Company:	City of Hutchinson
Address:	111 Hassan Street SE
	Hutchinson, MN 55350
Email To:	jpaulson@ci.hutchinson.mn.us
Phone:	320-234-5682 Fax: n/a
Requested Due Date/TAT:	Standard 10 day

Section B Required Project Information:

Report To:	John Paulson
Copy To:	
Purchase Order No.:	19554
Project Name:	
Project Number:	

Section C Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	00036446 by Adam Krieger
Pace Project Manager:	Timothy Sandager, 612-607-6456
Pace Profile #:	37715 #1

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MN

Section D Required Client Information

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
	WP
	AR
	OT
	TS

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Y/N	Analysis Test: Metals by 6010	Mercury by 7471	Moisture	Hexavalent Chromium	Trivalent Chromium (calculation)	Phosphorus	Nitrate + Nitrite	Ammonia	TKN	PCBs	TOC	Grain Size Hydrometer	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	Sed 50	SL	G	~~5/23/17~~	~~11:42~~	5/23/17	11:12		6	X								X	X	X	X	X	X	X	X	X	X	X	001
2	Sed 62	SL	G	•	•	5/23/17	11:55		6	X								X	X	X	X	X	X	X	X	X	X	X	002
3	Sed 62B	SL	G	•	•	5/23/17	11:50		1	X																		X	003
4	Sed 72	SL	G	•	•	5/23/17	12:44		6	X								X	X	X	X	X	X	X	X	X	X	X	004
5	Sed 129	SL	G	•	•	5/23/17	1:36		6	X								X	X	X	X	X	X	X	X	X	X	X	005
6	Sed 129B	SL	G	•	•	5/23/17	1:37		1	X																		X	006
7	Sed 142	SL	G	•	•	5/23/17	2:15		6	X								X	X	X	X	X	X	X	X	X	X	X	007
8	Sed 152	SL	G	•	•	5/23/17	2:53		6	X								X	X	X	X	X	X	X	X	X	X	X	008
9	Sed 162	S	G			5/23/17	3:31		6	X								X	X	X	X	X	X	X	X	X	X	X	009
10	Sed 178	S	G			5/23/17	4:09		6	X								X	X	X	X	X	X	X	X	X	X	X	010
11																													
12																													

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*Metals by 6010 = As, Cd, Cr, Cu, Pb, Ni, Se, Zn.	John W. Juntilla	5-24-17	0800		5-24-17	919	5.7	Y	Y	Y

SAMPLER NAME AND SIGNATURE: John W. Juntilla

PRINT Name of SAMPLER: John W. Juntilla

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY): 05-24-17

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 19Dec2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.20**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: City of Hutchinson

Project #: **WO# : 10389923**

10389923

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☑ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number:

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No **Optional:** Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermometer Used: ☑ 151401163 ☐ 151401164 **Type of Ice:** ☐ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 5.7 **Cooler Temp Corrected (°C):** 5.7 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** TRUE **Date and Initials of Person Examining Contents:** ME 5-24-17

USDA Regulated Soil (☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☑ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☑ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☑ Yes	☐ No		1.
Chain of Custody Filled Out?	☑ Yes	☐ No		2.
Chain of Custody Relinquished?	☑ Yes	☐ No		3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No		5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No		6.
Rush Turn Around Time Requested?	☐ Yes	☑ No		7.
Sufficient Volume?	☑ Yes	☐ No		8.
Correct Containers Used?	☑ Yes	☐ No		9.
-Pace Containers Used?	☐ Yes	☑ No		
Containers Intact?	☑ Yes	☐ No		10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: SL	☑ Yes	☐ No		12.
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH Positive for Res. Chlorine? Y N
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☑ N/A	Sample #
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin.	☐ Yes	☐ No	☑ N/A	Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: **Date:** 05/24/17

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Chain of Custody

WO# : 1288226

PM: HRZ **Due Date: 06/08/17**

CLIENT: PACE MPLS

Workorder: 10389923 **Workorder Name:** 19554 **Owner Received Date:** 5/24/2017 **Results Requested By:** 6/8/2017

Report To	Subcontract To
Timothy Sandager Pace Analytical Minnesota 1700 Elm Street Suite 200 Minneapolis, MN 55414 Phone (612)607-6456	Pace Analytical Virginia MN 315 Chestnut Street Virginia, MN 55792 Phone (218)742-1042

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: Unpreserved	Requested Analysis: Total Phos. / TKN	NTM / TOC	Ammonia	LAB USE ONLY
1	Sed 50	PS	5/23/2017 11:12	10389923001	Solid	2	X	X	X	001
2	Sed 62	PS	5/23/2017 11:55	10389923002	Solid	2	X			002
3	Sed 72	PS	5/23/2017 12:44	10389923004	Solid	2	X			003
4	Sed 129	PS	5/23/2017 13:36	10389923005	Solid	2	X			004
5	Sed 142	PS	5/23/2017 14:15	10389923007	Solid	2	X			005
6	Sed 152	PS	5/23/2017 14:53	10389923008	Solid	2	X			006
7	Sed 162	PS	5/23/2017 15:31	10389923009	Solid	2	X			007
8	Sed 178	PS	5/23/2017 16:09	10389923010	Solid	2	X			008

Transfers	Released By	Date/Time	Received By	Date/Time
1	PACE	5-25-17 9:49		5/25/17 1755
2		5/25/17 1745	Rhonda Jupa	5-26-17 8:00
3				

Comments

Cooler Temperature on Receipt 1.4 °C **Custody Seal** Y or N **Received on Ice** Y or N **Samples Intact** Y or N

****In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.*

This chain of custody is considered complete as is since this information is available in the owner laboratory.

Pace Analytical®	Document Name: Sample Condition Upon Receipt Form	Document Revised: 15Mar2016 Page 1 of 1
	Document No.: F-VM-C-001-Rev.10	Issuing Authority: Pace Virginia, Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: pace - MN

Project #

WO#: 1288226

PM: HRZ **Due Date: 06/08/17**

CLIENT: PACE MPLS

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace ☐ Other:

Tracking Number:

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No Seals Intact? ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☑ Other: Hanz Pak

Temp Blank? ☑ Yes ☐ No

Thermometer Used: ☑ 140792808 Type of Ice: ☑ Wet ☐ Blue ☐ None ☑ Samples on ice, cooling process has begun

Cooler Temp Read °C: 1.1 Cooler Temp Corrected °C: 1.9

Temp should be above freezing to 6°C Correction Factor: +0.8

Biological Tissue Frozen? ☐ Yes ☐ No ☑ NA

Date and Initials of Person Examining Contents: JDK 5/25/17

Comments: 5-26-17 KT

Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and Signature on COC?	☐ Yes	☐ No	☑ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5. If Fecal: ☐ <8 hours ☐ >8, <24 hours ☐ >24 hours
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	11. Note if sediment is visible in the dissolved containers.
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: SL				
All containers needing acid/base preservation will be checked and documented in the pH logbook.	☐ Yes	☐ No	☑ N/A	See pH log for results and additional preservation documentation
Headspace in Methyl Mercury Container	☐ Yes	☐ No	☑ N/A	13.
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

FECAL WAIVER ON FILE Y N

TEMPERATURE WAIVER ON FILE Y N

Project Manager Review: Date: 5-26-17

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

07-Jun-2017

Timothy Sandager
Pace Analytical
1700 Elm Street
Suite 200
Minneapolis, MN 55414

Re: **19554** Work Order: **17051573**

Dear Timothy,

ALS Environmental received 8 samples on 26-May-2017 09:30 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 18.

If you have any questions regarding this report, please feel free to contact me.

Sincerely,

Electronically approved by: Chad Whelton

Chad Whelton
Project Manager

Certificate No: MN 998501

ALS Group, USA

Date: 07-Jun-17

Client: Pace Analytical
Project: 19554
Work Order: **17051573**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
17051573-01	Sed 50	Solid		5/23/2017 11:12	5/26/2017 09:30	☐
17051573-02	Sed 62	Solid		5/23/2017 11:55	5/26/2017 09:30	☐
17051573-03	Sed 72	Solid		5/23/2017 12:44	5/26/2017 09:30	☐
17051573-04	Sed 129	Solid		5/23/2017 13:36	5/26/2017 09:30	☐
17051573-05	Sed 142	Solid		5/23/2017 14:15	5/26/2017 09:30	☐
17051573-06	Sed 152	Solid		5/23/2017 14:53	5/26/2017 09:30	☐
17051573-07	Sed 162	Solid		5/23/2017 15:31	5/26/2017 09:30	☐
17051573-08	Sed 178	Solid		5/23/2017 16:09	5/26/2017 09:30	☐

Client: Pace Analytical
Project: 19554
WorkOrder: **17051573**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
% of sample	Percent of Sample
mg/Kg-dry	Milligrams per Kilogram Dry Weight

ALS Group, USA

Date: *07-Jun-17*

Client: Pace Analytical
Project: 19554
Work Order: 17051573
Sample ID: Sed 50
Lab ID: 17051573-01
Collection Date: 5/23/2017 11:12 AM
Matrix: SOLID

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
CHROMIUM, HEXAVALENT			**SW7196A**	Prep: SW3060A 6/1/17 20:00		Analyst: **MB**
Chromium, Hexavalent	ND		2.9	mg/Kg-dry	1	6/2/2017 05:00 PM
MOISTURE			**SW3550C**			Analyst: **EDL**
Moisture	**67**		**0.050**	**% of sample**	1	5/30/2017 03:49 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: Pace Analytical
Project: 19554 **Work Order:** 17051573
Sample ID: Sed 62 **Lab ID:** 17051573-02
Collection Date: 5/23/2017 11:55 AM **Matrix:** SOLID

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
CHROMIUM, HEXAVALENT			**SW7196A**	Prep: SW3060A 6/1/17 20:00		Analyst: **MB**
Chromium, Hexavalent	ND		2.3	mg/Kg-dry	1	6/2/2017 05:00 PM
MOISTURE			**SW3550C**			Analyst: **EDL**
Moisture	**58**		**0.050**	**% of sample**	1	5/30/2017 03:49 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *07-Jun-17*

Client: Pace Analytical
Project: 19554
Work Order: 17051573
Sample ID: Sed 72
Lab ID: 17051573-03
Collection Date: 5/23/2017 12:44 PM
Matrix: SOLID

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
CHROMIUM, HEXAVALENT			**SW7196A**	Prep: SW3060A 6/1/17 20:00		Analyst: **MB**
Chromium, Hexavalent	ND		1.9	mg/Kg-dry	1	6/2/2017 05:00 PM
MOISTURE			**SW3550C**			Analyst: **EDL**
Moisture	**49**		**0.050**	**% of sample**	1	5/30/2017 03:49 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: Pace Analytical
Project: 19554 **Work Order:** 17051573
Sample ID: Sed 129 **Lab ID:** 17051573-04
Collection Date: 5/23/2017 01:36 PM **Matrix:** SOLID

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
CHROMIUM, HEXAVALENT			**SW7196A**	Prep: SW3060A 6/1/17 20:00		Analyst: **MB**
Chromium, Hexavalent	ND		1.7	mg/Kg-dry	1	6/2/2017 05:00 PM
MOISTURE			**SW3550C**			Analyst: **EDL**
Moisture	**46**		**0.050**	**% of sample**	1	5/30/2017 03:49 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *07-Jun-17*

Client: Pace Analytical
Project: 19554
Work Order: 17051573
Sample ID: Sed 142
Lab ID: 17051573-05
Collection Date: 5/23/2017 02:15 PM
Matrix: SOLID

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
CHROMIUM, HEXAVALENT			**SW7196A**	Prep: SW3060A 6/1/17 20:00		Analyst: **MB**
Chromium, Hexavalent	ND		2.3	mg/Kg-dry	1	6/2/2017 05:00 PM
MOISTURE			**SW3550C**			Analyst: **EDL**
Moisture	**57**		**0.050**	**% of sample**	1	5/30/2017 03:49 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: Pace Analytical
Project: 19554 **Work Order:** 17051573
Sample ID: Sed 152 **Lab ID:** 17051573-06
Collection Date: 5/23/2017 02:53 PM **Matrix:** SOLID

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
CHROMIUM, HEXAVALENT			**SW7196A**	Prep: SW3060A 6/1/17 20:00		Analyst: **MB**
Chromium, Hexavalent	ND		1.9	mg/Kg-dry	1	6/2/2017 05:00 PM
MOISTURE			**SW3550C**			Analyst: **EDL**
Moisture	**52**		**0.050**	**% of sample**	1	5/30/2017 03:49 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: Pace Analytical
Project: 19554 **Work Order:** 17051573
Sample ID: Sed 162 **Lab ID:** 17051573-07
Collection Date: 5/23/2017 03:31 PM **Matrix:** SOLID

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
CHROMIUM, HEXAVALENT			**SW7196A**	Prep: SW3060A 6/5/17 20:15		Analyst: **MB**
Chromium, Hexavalent	ND		1.8	mg/Kg-dry	1	6/6/2017 03:00 PM
MOISTURE			**SW3550C**			Analyst: **EDL**
Moisture	**46**		**0.050**	**% of sample**	1	5/30/2017 05:22 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: Pace Analytical
Project: 19554 **Work Order:** 17051573
Sample ID: Sed 178 **Lab ID:** 17051573-08
Collection Date: 5/23/2017 04:09 PM **Matrix:** SOLID

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
CHROMIUM, HEXAVALENT			**SW7196A**	Prep: SW3060A 6/5/17 20:15		Analyst: **MB**
Chromium, Hexavalent	ND		2.6	mg/Kg-dry	1	6/6/2017 03:00 PM
MOISTURE			**SW3550C**			Analyst: **EDL**
Moisture	**63**		**0.050**	**% of sample**	1	5/30/2017 05:22 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

QC BATCH REPORT

Batch ID: **102758** Instrument ID **WETCHEM** Method: **SW7196A**

MBLK Sample ID: **MBLK-102758-102758** Units: **mg/Kg** Analysis Date: **6/2/2017 05:00 PM**

Client ID: Run ID: **WETCHEM_170602O** SeqNo: **4461557** Prep Date: **6/1/2017** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	ND	1.0								

LCS Sample ID: **LCS-102758-102758** Units: **mg/Kg** Analysis Date: **6/2/2017 05:00 PM**

Client ID: Run ID: **WETCHEM_170602O** SeqNo: **4461558** Prep Date: **6/1/2017** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	4.44	1.0	5	0	88.8	80-120	0			

MS Sample ID: **1706088-01A MS** Units: **mg/Kg** Analysis Date: **6/2/2017 05:00 PM**

Client ID: Run ID: **WETCHEM_170602O** SeqNo: **4461569** Prep Date: **6/1/2017** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	4.402	1.1	5.747	-0.1023	78.4	75-125	0			

MS Sample ID: **1706088-01A MSI** Units: **mg/Kg** Analysis Date: **6/2/2017 05:00 PM**

Client ID: Run ID: **WETCHEM_170602O** SeqNo: **4461571** Prep Date: **6/1/2017** DF: **100**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	3308	110	3181	-0.1023	104	75-125	0			

MSD Sample ID: **1706088-01A MSD** Units: **mg/Kg** Analysis Date: **6/2/2017 05:00 PM**

Client ID: Run ID: **WETCHEM_170602O** SeqNo: **4461570** Prep Date: **6/1/2017** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	4.352	1.1	5.682	-0.1023	78.4	75-125	4.402	1.14	20	

The following samples were analyzed in this batch:

17051573-01A	17051573-02A	17051573-03A
17051573-04A	17051573-05A	17051573-06A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Pace Analytical
Work Order: 17051573
Project: 19554

QC BATCH REPORT

Batch ID: **102877** Instrument ID **WETCHEM** Method: **SW7196A**

MBLK Sample ID: **MBLK-102877-102877** Units: **mg/Kg** Analysis Date: **6/6/2017 03:00 PM**
Client ID: Run ID: **WETCHEM_170606H** SeqNo: **4466039** Prep Date: **6/5/2017** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	ND	1.0								

LCS Sample ID: **LCS-102877-102877** Units: **mg/Kg** Analysis Date: **6/6/2017 03:00 PM**
Client ID: Run ID: **WETCHEM_170606H** SeqNo: **4466038** Prep Date: **6/5/2017** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	4.32	1.0	5	0	86.4	80-120	0			

MS Sample ID: **17051419-04A MS** Units: **mg/Kg** Analysis Date: **6/6/2017 03:00 PM**
Client ID: Run ID: **WETCHEM_170606H** SeqNo: **4466021** Prep Date: **6/5/2017** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	4.859	1.0	5.051	0.0396	95.4	75-125	0			

MS Sample ID: **17051419-04A MSI** Units: **mg/Kg** Analysis Date: **6/6/2017 03:00 PM**
Client ID: Run ID: **WETCHEM_170606H** SeqNo: **4466023** Prep Date: **6/5/2017** DF: **100**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	2907	100	3007	0.0396	96.7	75-125	0			

MS Sample ID: **1706252-01A MS** Units: **mg/Kg** Analysis Date: **6/6/2017 03:00 PM**
Client ID: Run ID: **WETCHEM_170606H** SeqNo: **4466033** Prep Date: **6/5/2017** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	4.593	1.2	5.814	-0.1047	80.8	75-125	0			

MS Sample ID: **1706252-01A MSI** Units: **mg/Kg** Analysis Date: **6/6/2017 03:00 PM**
Client ID: Run ID: **WETCHEM_170606H** SeqNo: **4466035** Prep Date: **6/5/2017** DF: **100**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	3333	120	3499	-0.1047	95.3	75-125	0			

MSD Sample ID: **17051419-04A MSD** Units: **mg/Kg** Analysis Date: **6/6/2017 03:00 PM**
Client ID: Run ID: **WETCHEM_170606H** SeqNo: **4466022** Prep Date: **6/5/2017** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	4.485	1.0	5.051	0.0396	88	75-125	4.859	8	20	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Pace Analytical
Work Order: 17051573
Project: 19554

QC BATCH REPORT

Batch ID: **102877** Instrument ID **WETCHEM** Method: **SW7196A**

MSD	Sample ID: **1706252-01A MSD**			Units: **mg/Kg**			Analysis Date: **6/6/2017 03:00 PM**			
Client ID:		Run ID: **WETCHEM_170606H**		SeqNo: **4466034**		Prep Date: **6/5/2017**		DF: **1**		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	4.733	1.2	5.814	-0.1047	83.2	75-125	4.593	2.99	20	

The following samples were analyzed in this batch:

17051573-07A	17051573-08A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Pace Analytical
Work Order: 17051573
Project: 19554

QC BATCH REPORT

Batch ID: **R212923** Instrument ID **MOIST** Method: **SW3550C**

MBLK Sample ID: **WBLKS-R212923** Units: **% of sample** Analysis Date: **5/30/2017 03:49 PM**
Client ID: Run ID: **MOIST_170530B** SeqNo: **4456112** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	ND	0.050								

LCS Sample ID: **LCS-R212923** Units: **% of sample** Analysis Date: **5/30/2017 03:49 PM**
Client ID: Run ID: **MOIST_170530B** SeqNo: **4456111** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	100	0.050	100	0	100	99.5-100.5	0			

DUP Sample ID: **17051575-08B DUP** Units: **% of sample** Analysis Date: **5/30/2017 03:49 PM**
Client ID: Run ID: **MOIST_170530B** SeqNo: **4456099** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	20.62	0.050	0	0	0	0-0	20.19	2.11	5	

DUP Sample ID: **17051586-01B DUP** Units: **% of sample** Analysis Date: **5/30/2017 03:49 PM**
Client ID: Run ID: **MOIST_170530B** SeqNo: **4456102** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	37.4	0.050	0	0	0	0-0	39.31	4.98	5	

The following samples were analyzed in this batch:

17051573-01A	17051573-02A	17051573-03A
17051573-04A	17051573-05A	17051573-06A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Pace Analytical
Work Order: 17051573
Project: 19554

QC BATCH REPORT

Batch ID: **R212925** Instrument ID **MOIST** Method: **SW3550C**

MBLK Sample ID: **WBLKS-R212925** Units: **% of sample** Analysis Date: **5/30/2017 05:22 PM**
Client ID: Run ID: **MOIST_170530C** SeqNo: **4456181** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	ND	0.050								

LCS Sample ID: **LCS-R212925** Units: **% of sample** Analysis Date: **5/30/2017 05:22 PM**
Client ID: Run ID: **MOIST_170530C** SeqNo: **4456180** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	100	0.050	100	0	100	99.5-100.5	0			

DUP Sample ID: **17051248-02A DUP** Units: **% of sample** Analysis Date: **5/30/2017 05:22 PM**
Client ID: Run ID: **MOIST_170530C** SeqNo: **4456159** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	14.9	0.050	0	0	0	0-0	15.1	1.33	5	

DUP Sample ID: **17051688-01A DUP** Units: **% of sample** Analysis Date: **5/30/2017 05:22 PM**
Client ID: Run ID: **MOIST_170530C** SeqNo: **4456179** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	4.7	0.050	0	0	0	0-0	4.81	2.31	5	

The following samples were analyzed in this batch:

17051573-07A	17051573-08A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

17051573

Chain of Custody

Pace Analytical®
www.pacelabs.com

Workorder: 10389923 **Workorder Name:** 19554 **Results Requested By:** 6/8/2017

Report / Invoice To	Subcontract To
Timothy Sandager Pace Analytical Minnesota 1700 Elm Street Suite 200 Minneapolis, MN 55414 Phone (612)607-6456 Email: timothy.sandager@pacelabs.com	P.O._____

State of Sample Origin: MN

Item	Sample ID	Collect Date/Time	Lab ID	Matrix	Preserved Containers: Unpreserved	Requested Analysis: Hex Chrome	LAB USE ONLY
1	Sed 50	5/23/2017 11:12	10389923001	Solid	1	X	
2	Sed 62	5/23/2017 11:55	10389923002	Solid	1	X	
3	Sed 72	5/23/2017 12:44	10389923004	Solid	1	X	
4	Sed 129	5/23/2017 13:36	10389923005	Solid	1	X	
5	Sed 142	5/23/2017 14:15	10389923007	Solid	1	X	
6	Sed 152	5/23/2017 14:53	10389923008	Solid	1	X	
7	Sed 162	5/23/2017 15:31	10389923009	Solid	1	X	
8	Sed 178	5/23/2017 16:09	10389923010	Solid	1	X	
9							
10							
11							
12							

Transfers	Released By	Date/Time	Received By	Date/Time
1	Aaron Dahl / Pace	5/25/17 1433	[signature]	5/26/17 0930
2				
3				

Comments

Cooler Temperature on Receipt 4.0 °C SR2 | Custody Seal Y or N | Received on Ice Y or N | Samples Intact Y or N

ALS Group, USA

Sample Receipt Checklist

Client Name: **PACE_MN** Date/Time Received: **26-May-17 09:30**

Work Order: **17051573** Received by: **DS**

Checklist completed by Diane Shaw (eSignature) 26-May-17 (Date) Reviewed by: Chad Whelton (eSignature) 26-May-17 (Date)

Matrices: Solid

Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	4.0/4.0 c	SR2	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	5/26/2017 12:35:36 PM		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑
pH adjusted?	Yes ☐	No ☐	N/A ☑
pH adjusted by:	-		

Login Notes:

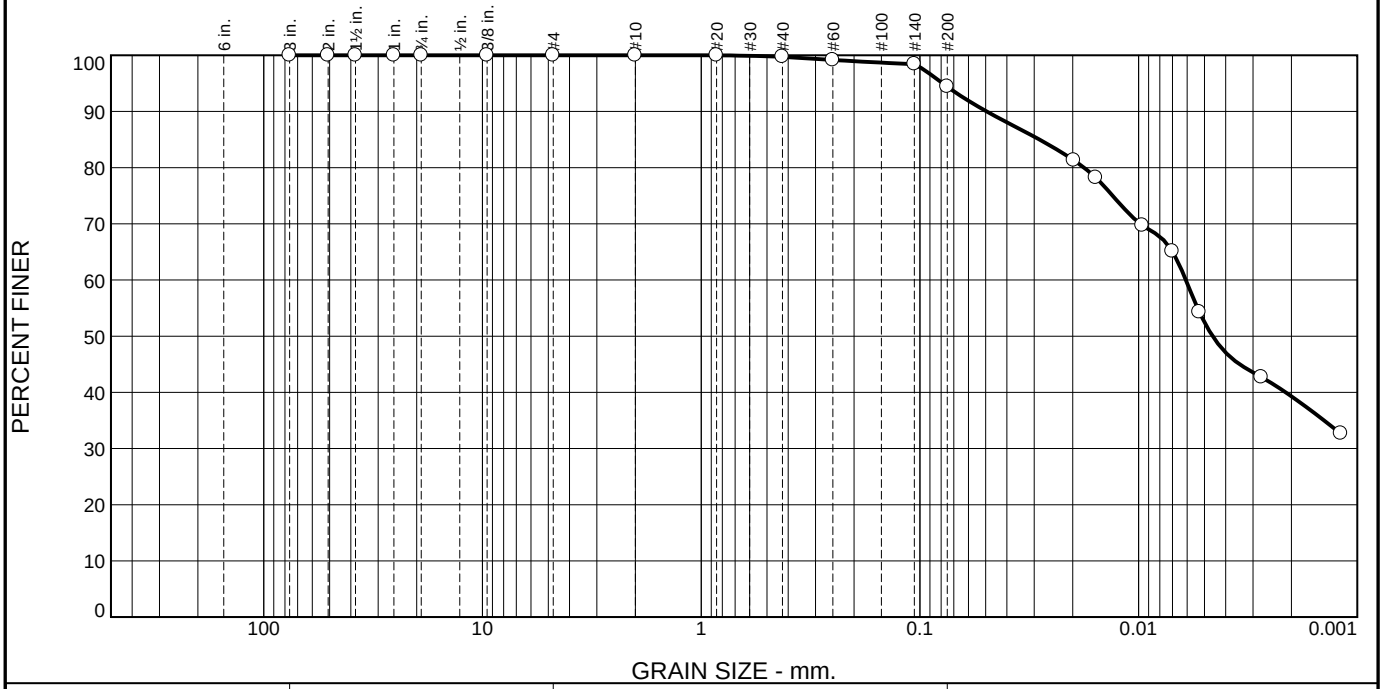
Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction:

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	6	42	52

TEST RESULTS (ASTM D422)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100		
2	100		
1.5	100		
1	100		
.75	100		
.375	100		
#4	100		
#10	100		
#20	100		
#40	100		
#60	99		
#140	98		
#200	94		
0.0198 mm.	81		
0.0157 mm.	78		
0.0096 mm.	70		
0.0070 mm.	65		
0.0053 mm.	54		
0.0027 mm.	43		
0.0012 mm.	33		

* (no specification provided)

Material Description

silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.0495 D_{85}= 0.0284 D_{60}= 0.0061
D_{50}= 0.0046 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 5/24/17 **Date Tested:** 6/2/17

Tested By: Christine Holzwarth

Checked By: Rhonda Johnson

Title: Lab Manager

Location: Sed 50
Sample Number: 10389923-001

Date Sampled: 5/23/17

Pace Analytical Services, Inc.

Billings, MT

Client: City of Hutchinson
Project: 19554

Project No: **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

6/5/2017

Client: City of Hutchinson
Project: 19554
Location: Sed 50
Sample Number: 10389923-001
Material Description: silt
Sample Date: 5/23/17
Date Received: 5/24/17 **PL:** NP **LL:** NV **PI:** NP
USCS Classification: ML **AASHTO Classification:** A-4(0)
Grain Size Test Method: ASTM D422
Tested By: Christine Holzwarth **Test Date:** 6/2/17
Checked By: Rhonda Johnson **Title:** Lab Manager

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
1246.24	558.80	3	0.00	0.00	100
		2	0.00	0.00	100
		1.5	0.00	0.00	100
		1	0.00	0.00	100
		.75	0.00	0.00	100
		.375	0.00	0.00	100
		#4	0.00	0.00	100
		#10	0.00	0.00	100
61.16	0.00	#20	0.00	0.00	100
		#40	0.16	0.00	100
		#60	0.35	0.00	99
		#140	0.46	0.00	98
		#200	2.44	0.00	94

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 94
Weight of hydrometer sample =61.16
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -6
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 **-** 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
3.00	23.0	58.0	52.7	0.0132	58.0	6.8	0.0198	81.3
5.00	23.0	56.0	50.7	0.0132	56.0	7.1	0.0157	78.2
15.00	23.0	50.5	45.2	0.0132	50.5	8.0	0.0096	69.7
30.00	23.0	47.5	42.2	0.0132	47.5	8.5	0.0070	65.1
60.00	23.0	40.5	35.2	0.0132	40.5	9.7	0.0053	54.3
250.00	23.0	33.0	27.7	0.0132	33.0	10.9	0.0027	42.7
1460.00	23.0	26.5	21.2	0.0132	26.5	11.9	0.0012	32.7

Pace Analytical Services, Inc.

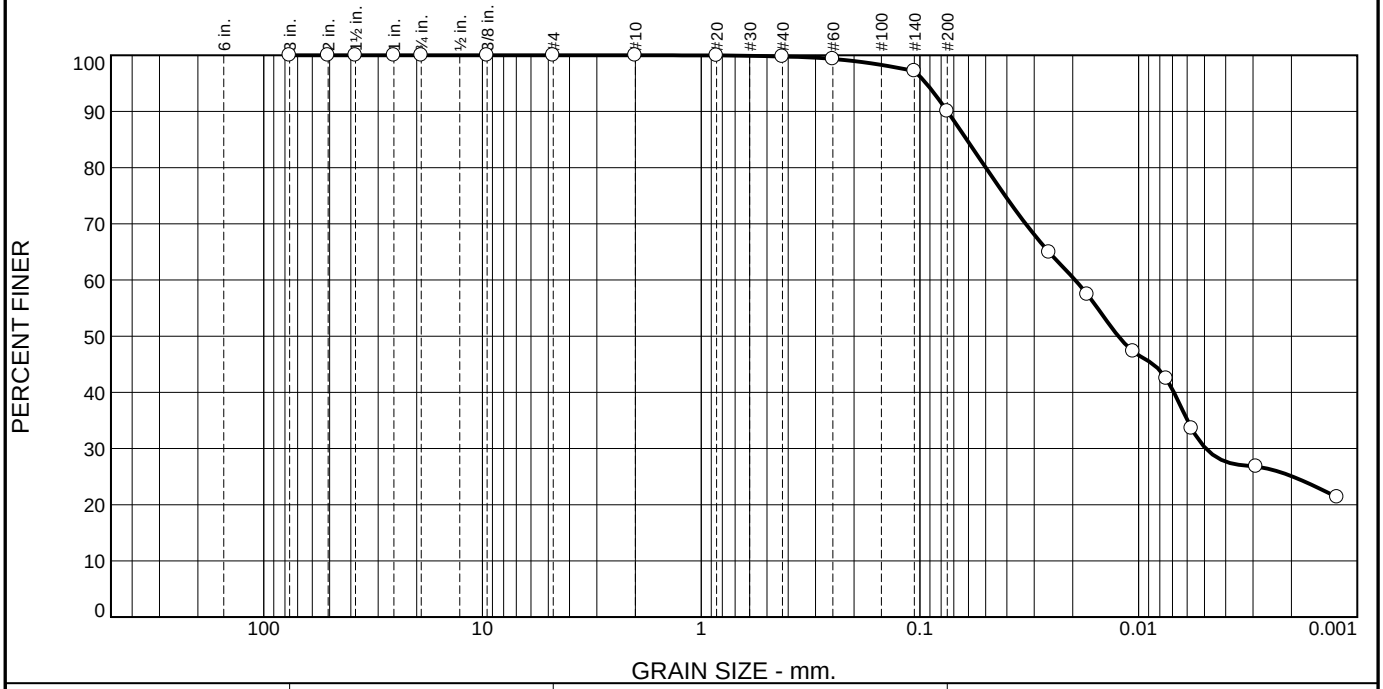
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0	0	0	0	0	0	6	6	42	52	94

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.0021	0.0046	0.0061	0.0177	0.0284	0.0495	0.0786

Fineness Modulus
0.02

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	10	60	30

TEST RESULTS (ASTM D244)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100		
2	100		
1.5	100		
1	100		
.75	100		
.375	100		
#4	100		
#10	100		
#20	100		
#40	100		
#60	99		
#140	97		
#200	90		
0.0256 mm.	65		
0.0172 mm.	57		
0.0106 mm.	47		
0.0075 mm.	42		
0.0057 mm.	34		
0.0029 mm.	27		
0.0012 mm.	21		

* (no specification provided)

Material Description

silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.0749 D_{85}= 0.0611 D_{60}= 0.0195
D_{50}= 0.0124 D_{30}= 0.0049 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 5/24/17 **Date Tested:** 6/2/17

Tested By: Christine Holzwarth

Checked By: Rhonda Johnson

Title: Lab Manager

Location: Sed 62
Sample Number: 10389923-002

Date Sampled: 5/23/17

Pace Analytical Services, Inc.

Billings, MT

Client: City of Hutchinson
Project: 19554

Project No: **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

6/5/2017

Client: City of Hutchinson
Project: 19554
Location: Sed 62
Sample Number: 10389923-002
Material Description: silt
Sample Date: 5/23/17
Date Received: 5/24/17 **PL:** NP **LL:** NV **PI:** NP
USCS Classification: ML **AASHTO Classification:** A-4(0)
Grain Size Test Method: ASTM D244
Tested By: Christine Holzwarth **Test Date:** 6/2/17
Checked By: Rhonda Johnson **Title:** Lab Manager

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
778.34	572.16	3	0.00	0.00	100
		2	0.00	0.00	100
		1.5	0.00	0.00	100
		1	0.00	0.00	100
		.75	0.00	0.00	100
		.375	0.00	0.00	100
		#4	0.00	0.00	100
		#10	0.00	0.00	100
66.10	0.00	#20	0.02	0.00	100
		#40	0.14	0.00	100
		#60	0.27	0.00	99
		#140	1.43	0.00	97
		#200	4.72	0.00	90

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 90
Weight of hydrometer sample =66.1
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -6
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 **-** 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	23.0	53.0	47.7	0.0132	53.0	7.6	0.0256	64.9
5.00	23.0	47.5	42.2	0.0132	47.5	8.5	0.0172	57.4
15.00	23.0	40.0	34.7	0.0132	40.0	9.7	0.0106	47.3
32.00	23.0	36.5	31.2	0.0132	36.5	10.3	0.0075	42.5
60.00	23.0	30.0	24.7	0.0132	30.0	11.4	0.0057	33.6
250.00	23.0	25.0	19.7	0.0132	25.0	12.2	0.0029	26.8

Pace Analytical Services, Inc.

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1454.00	23.0	21.0	15.7	0.0132	21.0	12.9	0.0012	21.3

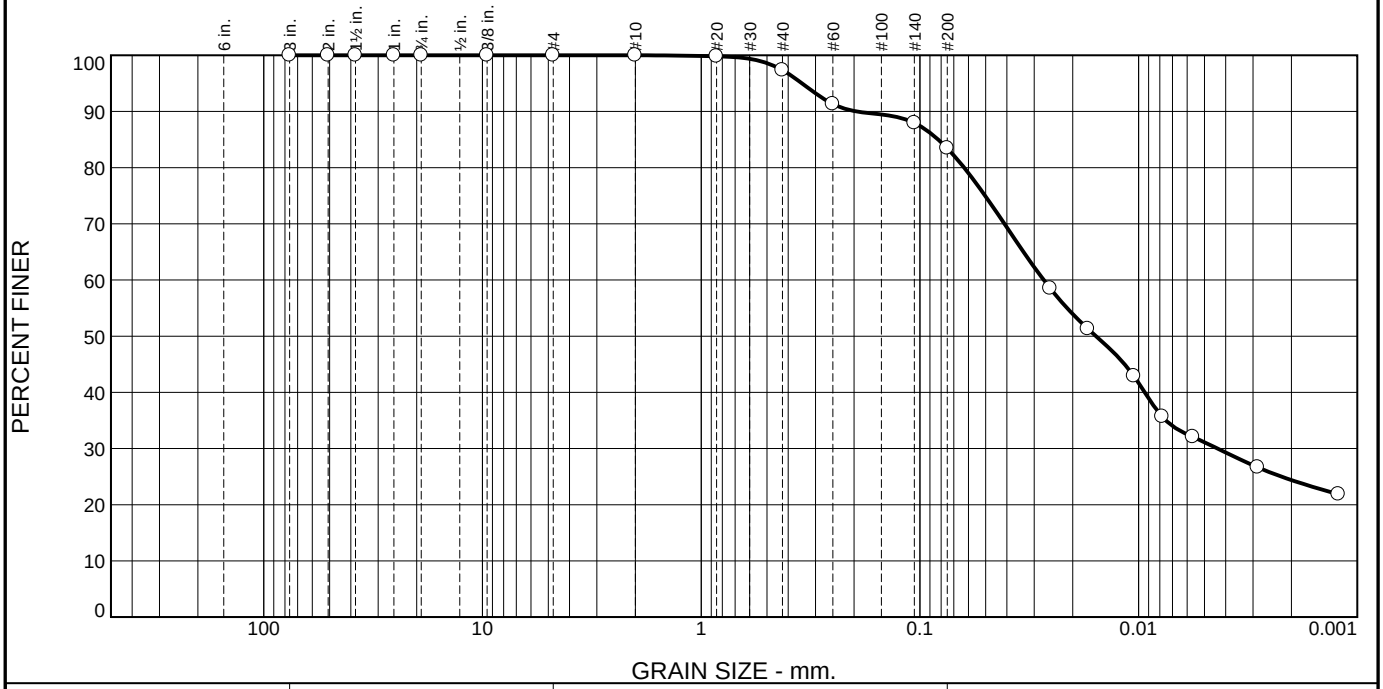
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0	0	0	0	0	0	10	10	60	30	90

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0049	0.0069	0.0124	0.0195	0.0500	0.0611	0.0749	0.0935

Fineness Modulus
0.02

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	3	14	52	31

TEST RESULTS (ASTM D422)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100		
2	100		
1.5	100		
1	100		
.75	100		
.375	100		
#4	100		
#10	100		
#20	100		
#40	97		
#60	91		
#140	88		
#200	83		
0.0254 mm.	59		
0.0171 mm.	51		
0.0105 mm.	43		
0.0078 mm.	36		
0.0056 mm.	32		
0.0029 mm.	27		
0.0012 mm.	22		

* (no specification provided)

Material Description

silt with sand

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.1947 D_{85}= 0.0824 D_{60}= 0.0271
D_{50}= 0.0157 D_{30}= 0.0044 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 5/24/17 **Date Tested:** 6/2/17

Tested By: Christine Holzwarth

Checked By: Rhonda Johnson

Title: Lab Manager

Location: Sed 62 B
Sample Number: 10389923-003

Date Sampled: 5/23/17

Pace Analytical Services, Inc.

Billings, MT

Client: City of Hutchinson
Project: 19554

Project No: **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

6/5/2017

Client: City of Hutchinson
Project: 19554
Location: Sed 62 B
Sample Number: 10389923-003
Material Description: silt with sand
Sample Date: 5/23/17
Date Received: 5/24/17 **PL:** NP **LL:** NV **PI:** NP
USCS Classification: ML **AASHTO Classification:** A-4(0)
Grain Size Test Method: ASTM D422
Tested By: Christine Holzwarth **Test Date:** 6/2/17
Checked By: Rhonda Johnson **Title:** Lab Manager

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
2073.96	570.01	3	0.00	0.00	100
		2	0.00	0.00	100
		1.5	0.00	0.00	100
		1	0.00	0.00	100
		.75	0.00	0.00	100
		.375	0.00	0.00	100
		#4	0.00	0.00	100
		#10	0.00	0.00	100
69.39	0.00	#20	0.13	0.00	100
		#40	1.70	0.00	97
		#60	4.20	0.00	91
		#140	2.33	0.00	88
		#200	3.12	0.00	83

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 83
Weight of hydrometer sample =69.39
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -6
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 **-** 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	23.0	54.0	48.7	0.0132	54.0	7.4	0.0254	58.5
5.00	23.0	48.0	42.7	0.0132	48.0	8.4	0.0171	51.3
15.00	23.0	41.0	35.7	0.0132	41.0	9.6	0.0105	42.9
30.00	23.0	35.0	29.7	0.0132	35.0	10.6	0.0078	35.7
60.00	23.0	32.0	26.7	0.0132	32.0	11.0	0.0056	32.1
250.00	23.0	27.5	22.2	0.0132	27.5	11.8	0.0029	26.7
1449.00	23.0	23.5	18.2	0.0132	23.5	12.4	0.0012	21.8

Pace Analytical Services, Inc.

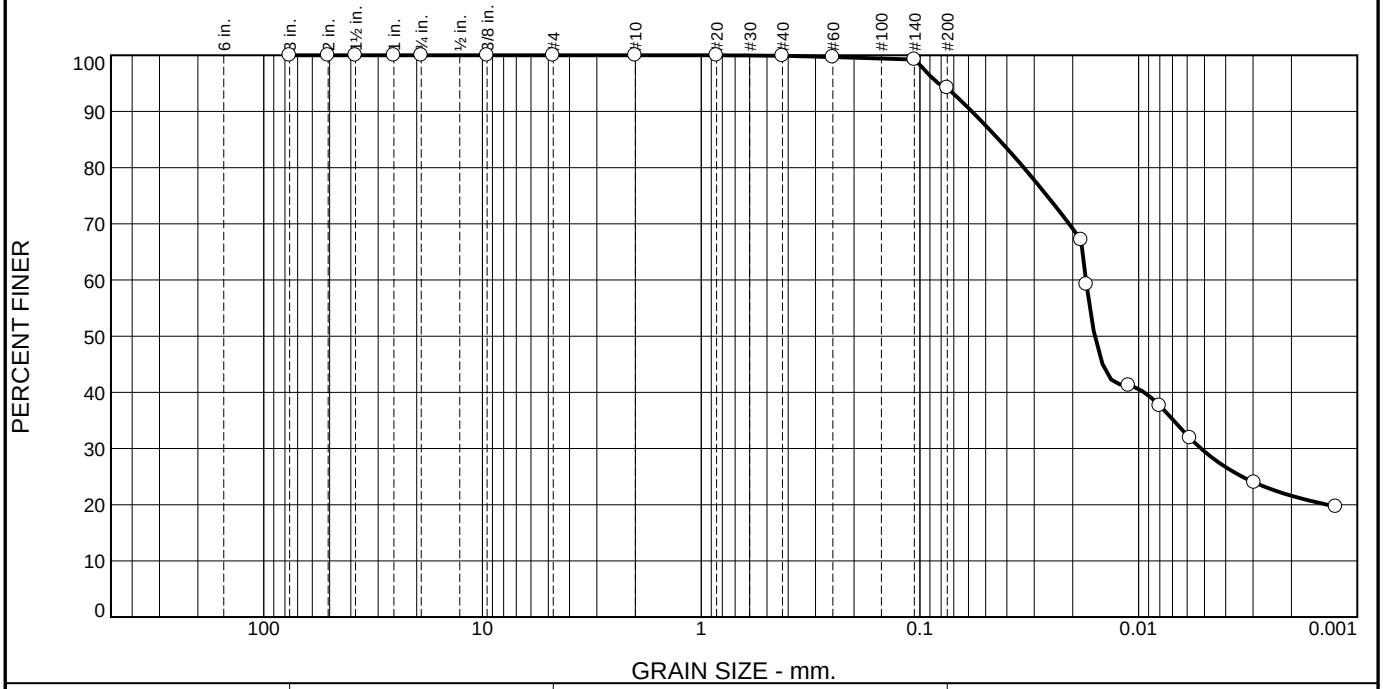
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0	0	0	0	0	3	14	17	52	31	83

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0044	0.0094	0.0157	0.0271	0.0628	0.0824	0.1947	0.3457

Fineness Modulus
0.18

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	6	65	29

TEST RESULTS (ASTM D422)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100		
2	100		
1.5	100		
1	100		
.75	100		
.375	100		
#4	100		
#10	100		
#20	100		
#40	100		
#60	100		
#140	99		
#200	94		
0.0183 mm.	67		
0.0173 mm.	59		
0.0111 mm.	41		
0.0080 mm.	38		
0.0058 mm.	32		
0.0030 mm.	24		
0.0013 mm.	20		

* (no specification provided)

Material Description

silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.0579 D_{85}= 0.0436 D_{60}= 0.0174
D_{50}= 0.0159 D_{30}= 0.0052 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 5/24/17 **Date Tested:** 6/2/17

Tested By: Christine Holzwarth

Checked By: Rhonda Johnson

Title: Lab Manager

Location: Sed 72
Sample Number: 10389923-004

Date Sampled: 5/23/17

Pace Analytical Services, Inc.

Billings, MT

Client: City of Hutchinson
Project: 19554

Project No: **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

6/5/2017

Client: City of Hutchinson
Project: 19554
Location: Sed 72
Sample Number: 10389923-004
Material Description: silt
Sample Date: 5/23/17
Date Received: 5/24/17 **PL:** NP **LL:** NV **PI:** NP
USCS Classification: ML **AASHTO Classification:** A-4(0)
Grain Size Test Method: ASTM D422
Tested By: Christine Holzwarth **Test Date:** 6/2/17
Checked By: Rhonda Johnson **Title:** Lab Manager

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
1185.84	566.60	3	0.00	0.00	100
		2	0.00	0.00	100
		1.5	0.00	0.00	100
		1	0.00	0.00	100
		.75	0.00	0.00	100
		.375	0.00	0.00	100
		#4	0.00	0.00	100
		#10	0.00	0.00	100
65.47	0.00	#20	0.00	0.00	100
		#40	0.06	0.00	100
		#60	0.15	0.00	100
		#140	0.29	0.00	99
		#200	3.30	0.00	94

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 94
Weight of hydrometer sample =65.47
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -6
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 **-** 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
4.00	23.0	52.0	46.7	0.0132	52.0	7.8	0.0183	67.1
5.00	23.0	46.5	41.2	0.0132	46.5	8.7	0.0173	59.2
15.00	23.0	34.0	28.7	0.0132	34.0	10.7	0.0111	41.2
30.00	23.0	31.5	26.2	0.0132	31.5	11.1	0.0080	37.6
60.00	23.0	27.5	22.2	0.0132	27.5	11.8	0.0058	31.9
250.00	23.0	22.0	16.7	0.0132	22.0	12.7	0.0030	24.0
1447.00	23.0	19.0	13.7	0.0132	19.0	13.2	0.0013	19.7

Pace Analytical Services, Inc.

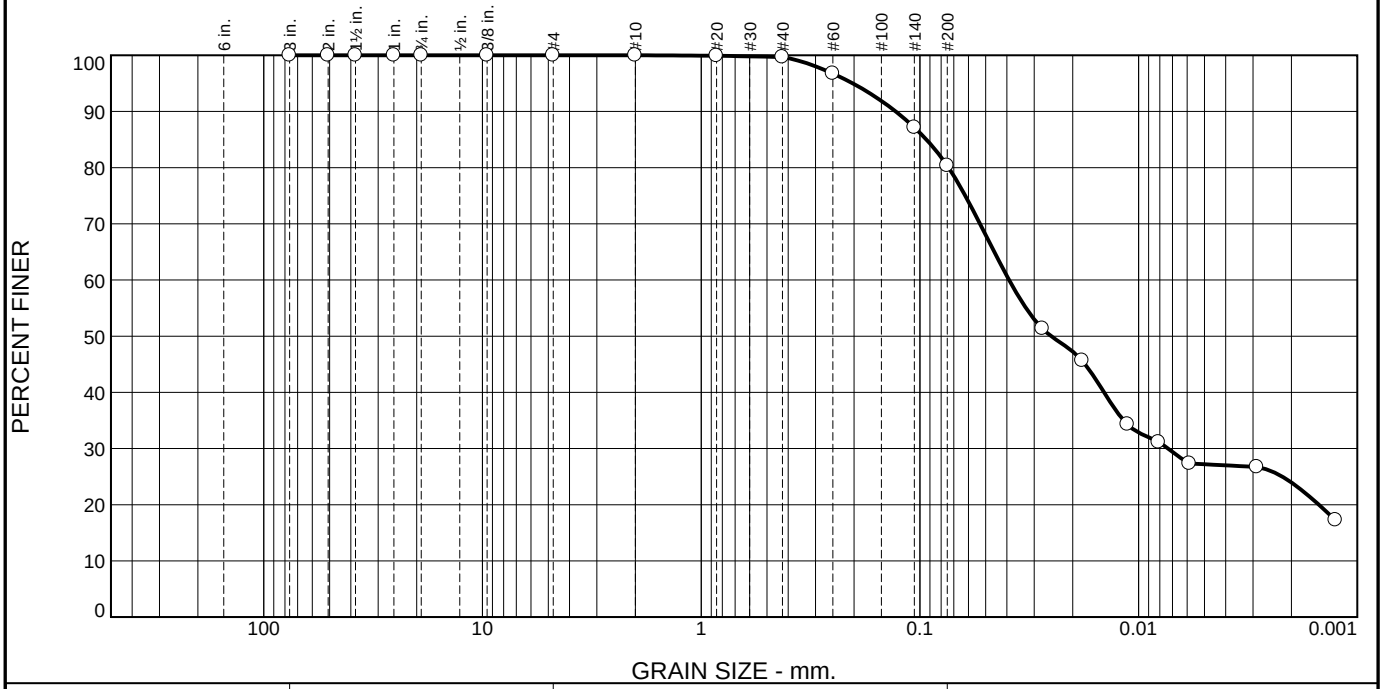
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0	0	0	0	0	0	6	6	65	29	94

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0014	0.0052	0.0094	0.0159	0.0174	0.0335	0.0436	0.0579	0.0824

Fineness Modulus
0.01

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	20	53	27

TEST RESULTS (ASTM D422)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100		
2	100		
1.5	100		
1	100		
.75	100		
.375	100		
#4	100		
#10	100		
#20	100		
#40	100		
#60	97		
#140	87		
#200	80		
0.0275 mm.	51		
0.0181 mm.	46		
0.0112 mm.	34		
0.0081 mm.	31		
0.0058 mm.	27		
0.0029 mm.	27		
0.0013 mm.	17		

* (no specification provided)

Material Description

silt with sand

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.1291 D_{85}= 0.0933 D_{60}= 0.0391
D_{50}= 0.0251 D_{30}= 0.0073 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 5/24/17 **Date Tested:** 6/2/17

Tested By: Christine Holzwarth

Checked By: Rhonda Johnson

Title: Lab Manager

Location: Sed 129
Sample Number: 10389923-005

Date Sampled: 5/23/17

Pace Analytical Services, Inc.

Billings, MT

Client: City of Hutchinson
Project: 19554

Project No: **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

6/5/2017

Client: City of Hutchinson
Project: 19554
Location: Sed 129
Sample Number: 10389923-005
Material Description: silt with sand
Sample Date: 5/23/17
Date Received: 5/24/17 **PL:** NP **LL:** NV **PI:** NP
USCS Classification: ML **AASHTO Classification:** A-4(0)
Grain Size Test Method: ASTM D422
Tested By: Christine Holzwarth **Test Date:** 6/2/17
Checked By: Rhonda Johnson **Title:** Lab Manager

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
2738.36	1150.51	3	0.00	0.00	100
		2	0.00	0.00	100
		1.5	0.00	0.00	100
		1	0.00	0.00	100
		.75	0.00	0.00	100
		.375	0.00	0.00	100
		#4	0.00	0.00	100
		#10	0.00	0.00	100
63.67	0.00	#20	0.06	0.00	100
		#40	0.14	0.00	100
		#60	1.87	0.00	97
		#140	6.12	0.00	87
		#200	4.31	0.00	80

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 80
Weight of hydrometer sample =63.67
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -6
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 **-** 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	23.0	46.0	40.7	0.0132	46.0	8.8	0.0275	51.3
5.00	23.0	41.5	36.2	0.0132	41.5	9.5	0.0181	45.6
15.00	23.0	32.5	27.2	0.0132	32.5	11.0	0.0112	34.3
30.00	23.0	30.0	24.7	0.0132	30.0	11.4	0.0081	31.1
60.00	23.0	27.0	21.7	0.0132	27.0	11.9	0.0058	27.3
250.00	23.0	26.5	21.2	0.0132	26.5	11.9	0.0029	26.7
1443.00	23.0	19.0	13.7	0.0132	19.0	13.2	0.0013	17.2

Pace Analytical Services, Inc.

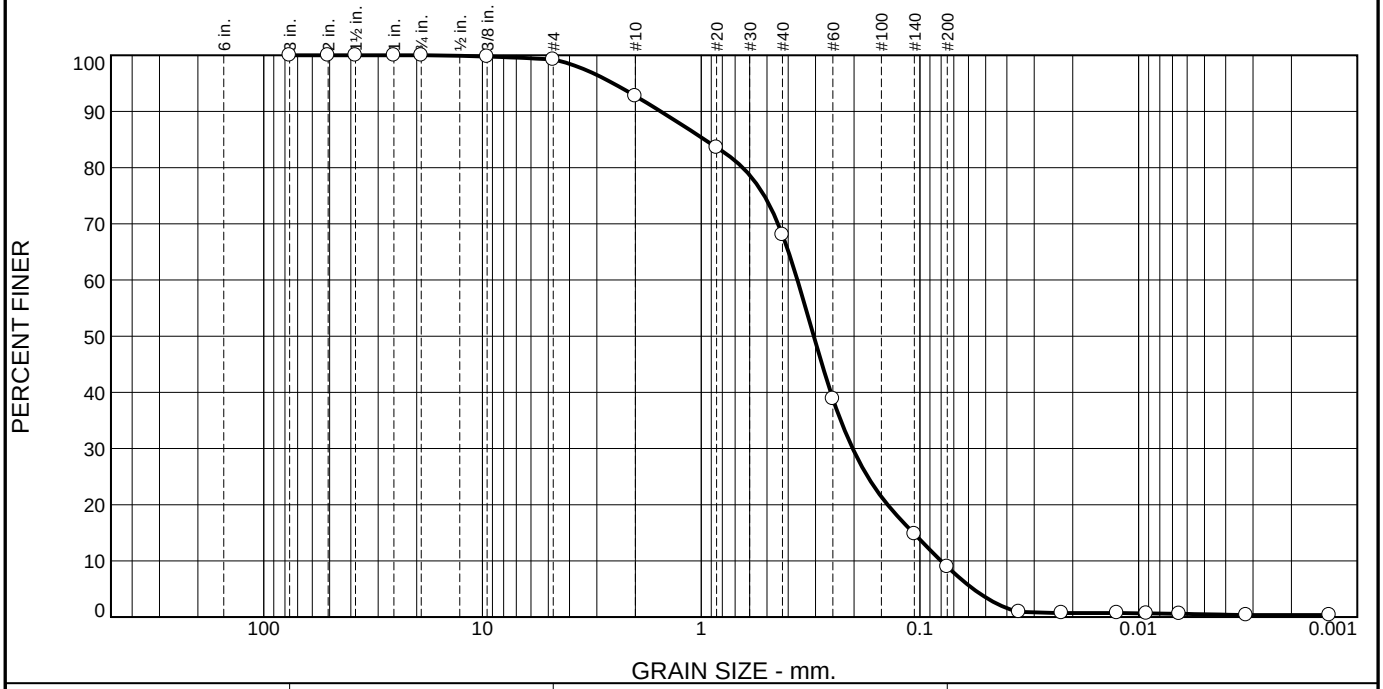
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0	0	0	0	0	0	20	20	53	27	80

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0015	0.0073	0.0144	0.0251	0.0391	0.0739	0.0933	0.1291	0.2027

Fineness Modulus
0.10

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	1	6	25	59	8	1

TEST RESULTS (ASTM D422)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100		
2	100		
1.5	100		
1	100		
.75	100		
.375	100		
#4	99		
#10	93		
#20	84		
#40	68		
#60	39		
#140	15		
#200	9.0		
0.0352 mm.	0.9		
0.0225 mm.	0.7		
0.0126 mm.	0.7		
0.0092 mm.	0.7		
0.0065 mm.	0.6		
0.0032 mm.	0.4		
0.0013 mm.	0.4		

* (no specification provided)

Material Description

poorly graded sand with silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-3

Coefficients

D_{90}= 1.5307 D_{85}= 0.9652 D_{60}= 0.3630
D_{50}= 0.3056 D_{30}= 0.2030 D_{15}= 0.1071
D_{10}= 0.0800 C_u= 4.54 C_c= 1.42

Remarks

Date Received: 5/24/17 **Date Tested:** 6/2/17

Tested By: Christine Holzwarth

Checked By: Rhonda Johnson

Title: Lab Manager

Location: Sed 129 B
Sample Number: 10389923-006

Date Sampled: 5/23/17

Pace Analytical Services, Inc.

Billings, MT

Client: City of Hutchinson
Project: 19554

Project No: **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

6/5/2017

Client: City of Hutchinson
Project: 19554
Location: Sed 129 B
Sample Number: 10389923-006
Material Description: poorly graded sand with silt
Sample Date: 5/23/17
Date Received: 5/24/17 **PL:** NP **LL:** NV **PI:** NP
USCS Classification: SP-SM **AASHTO Classification:** A-3
Grain Size Test Method: ASTM D422
Tested By: Christine Holzwarth **Test Date:** 6/2/17
Checked By: Rhonda Johnson **Title:** Lab Manager

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
1807.74	573.54	3	0.00	0.00	100
		2	0.00	0.00	100
		1.5	0.00	0.00	100
		1	0.00	0.00	100
		.75	0.00	0.00	100
		.375	2.78	0.00	100
		#4	6.45	0.00	99
		#10	80.24	0.00	93
63.86	0.00	#20	6.31	0.00	84
		#40	10.70	0.00	68
		#60	20.09	0.00	39
		#140	16.56	0.00	15
		#200	4.03	0.00	9.0

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 9
Weight of hydrometer sample =63.86
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -6
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 **-** 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	23.0	12.0	6.7	0.0132	12.0	14.3	0.0352	0.9
5.00	23.0	10.5	5.2	0.0132	10.5	14.6	0.0225	0.7
16.00	23.0	10.5	5.2	0.0132	10.5	14.6	0.0126	0.7
30.00	23.0	10.0	4.7	0.0132	10.0	14.7	0.0092	0.7
60.00	23.0	9.5	4.2	0.0132	9.5	14.7	0.0065	0.6
250.00	23.0	8.0	2.7	0.0132	8.0	15.0	0.0032	0.4
1440.00	23.0	8.0	2.7	0.0132	8.0	15.0	0.0013	0.4

Pace Analytical Services, Inc.

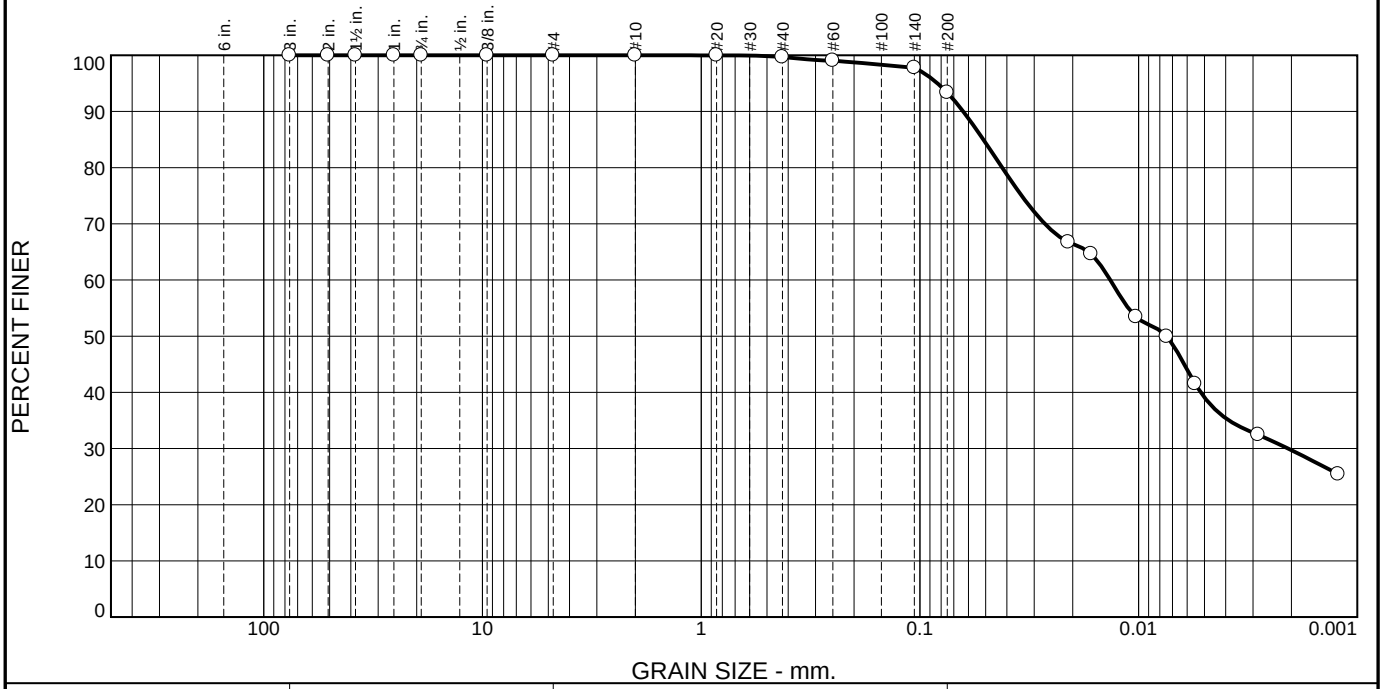
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0	0	1	1	6	25	59	90	8	1	9

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0569	0.0800	0.1071	0.1405	0.2030	0.2556	0.3056	0.3630	0.6450	0.9652	1.5307	2.5247

Fineness Modulus	C_u	C_c
1.70	4.54	1.42

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	7	54	39

TEST RESULTS (ASTM D422)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100		
2	100		
1.5	100		
1	100		
.75	100		
.375	100		
#4	100		
#10	100		
#20	100		
#40	100		
#60	99		
#140	98		
#200	93		
0.0209 mm.	67		
0.0165 mm.	65		
0.0103 mm.	53		
0.0074 mm.	50		
0.0055 mm.	42		
0.0028 mm.	32		
0.0012 mm.	25		

* (no specification provided)

Material Description

silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.0634 D_{85}= 0.0513 D_{60}= 0.0135
D_{50}= 0.0075 D_{30}= 0.0021 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 5/24/17 **Date Tested:** 6/2/17

Tested By: Christine Holzwarth

Checked By: Rhonda Johnson

Title: Lab Manager

Location: Sed 142
Sample Number: 10389923-007

Date Sampled: 5/23/17

Pace Analytical Services, Inc.

Billings, MT

Client: City of Hutchinson
Project: 19554

Project No: **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

6/5/2017

Client: City of Hutchinson
Project: 19554
Location: Sed 142
Sample Number: 10389923-007
Material Description: silt
Sample Date: 5/23/17
Date Received: 5/24/17 **PL:** NP **LL:** NV **PI:** NP
USCS Classification: ML **AASHTO Classification:** A-4(0)
Grain Size Test Method: ASTM D422
Tested By: Christine Holzwarth **Test Date:** 6/2/17
Checked By: Rhonda Johnson **Title:** Lab Manager

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
1110.49	593.00	3	0.00	0.00	100
		2	0.00	0.00	100
		1.5	0.00	0.00	100
		1	0.00	0.00	100
		.75	0.00	0.00	100
		.375	0.00	0.00	100
		#4	0.00	0.00	100
		#10	0.00	0.00	100
66.67	0.00	#20	0.01	0.00	100
		#40	0.20	0.00	100
		#60	0.43	0.00	99
		#140	0.85	0.00	98
		#200	2.94	0.00	93

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 93
Weight of hydrometer sample =66.67
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -6
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 **-** 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
3.00	23.0	53.0	47.7	0.0132	53.0	7.6	0.0209	66.7
5.00	23.0	51.5	46.2	0.0132	51.5	7.8	0.0165	64.6
15.00	23.0	43.5	38.2	0.0132	43.5	9.2	0.0103	53.4
30.00	23.0	41.0	35.7	0.0132	41.0	9.6	0.0074	49.9
60.00	23.0	35.0	29.7	0.0132	35.0	10.6	0.0055	41.5
250.00	23.0	28.5	23.2	0.0132	28.5	11.6	0.0028	32.4
1440.00	23.0	23.5	18.2	0.0132	23.5	12.4	0.0012	25.4

Pace Analytical Services, Inc.

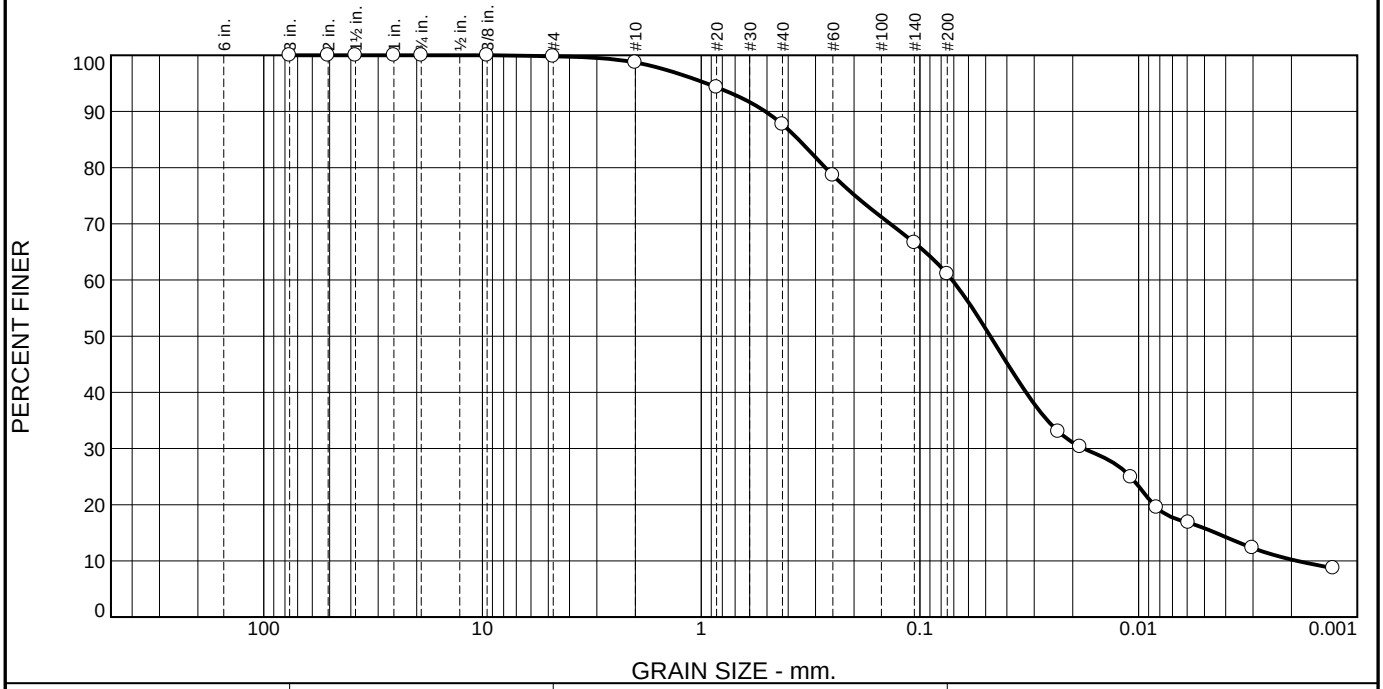
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0	0	0	0	0	0	7	7	54	39	93

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0021	0.0052	0.0075	0.0135	0.0420	0.0513	0.0634	0.0830

Fineness Modulus
0.03

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	1	11	27	45	16

TEST RESULTS (ASTM D422)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100		
2	100		
1.5	100		
1	100		
.75	100		
.375	100		
#4	100		
#10	99		
#20	94		
#40	88		
#60	79		
#140	67		
#200	61		
0.0233 mm.	33		
0.0185 mm.	30		
0.0108 mm.	25		
0.0083 mm.	20		
0.0059 mm.	17		
0.0030 mm.	12		
0.0013 mm.	8.7		

* (no specification provided)

Material Description

sandy silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.5084 D_{85}= 0.3588 D_{60}= 0.0712
D_{50}= 0.0477 D_{30}= 0.0178 D_{15}= 0.0044
D_{10}= 0.0019 C_u= 37.81 C_c= 2.36

Remarks

Date Received: 5/24/17 **Date Tested:** 6/2/17

Tested By: Christine Holzwarth

Checked By: Rhonda Johnson

Title: Lab Manager

Location: Sed 152
Sample Number: 10389923-008

Date Sampled: 5/23/17

Pace Analytical Services, Inc.

Billings, MT

Client: City of Hutchinson
Project: 19554

Project No: **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

6/5/2017

Client: City of Hutchinson
Project: 19554
Location: Sed 152
Sample Number: 10389923-008
Material Description: sandy silt
Sample Date: 5/23/17
Date Received: 5/24/17 **PL:** NP **LL:** NV **PI:** NP
USCS Classification: ML **AASHTO Classification:** A-4(0)
Grain Size Test Method: ASTM D422
Tested By: Christine Holzwarth **Test Date:** 6/2/17
Checked By: Rhonda Johnson **Title:** Lab Manager

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
808.62	608.02	3	0.00	0.00	100
		2	0.00	0.00	100
		1.5	0.00	0.00	100
		1	0.00	0.00	100
		.75	0.00	0.00	100
		.375	0.00	0.00	100
		#4	0.38	0.00	100
		#10	2.20	0.00	99
67.79	0.00	#20	3.04	0.00	94
		#40	4.52	0.00	88
		#60	6.23	0.00	79
		#140	8.25	0.00	67
		#200	3.81	0.00	61

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 61
Weight of hydrometer sample =67.79
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -6
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 **-** 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
3.00	23.0	42.0	36.7	0.0132	42.0	9.4	0.0233	33.0
5.00	23.0	39.0	33.7	0.0132	39.0	9.9	0.0185	30.3
16.00	23.0	33.0	27.7	0.0132	33.0	10.9	0.0108	24.9
30.00	23.0	27.0	21.7	0.0132	27.0	11.9	0.0083	19.5
61.00	23.0	24.0	18.7	0.0132	24.0	12.4	0.0059	16.8
250.00	23.0	19.0	13.7	0.0132	19.0	13.2	0.0030	12.3

Pace Analytical Services, Inc.

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1440.00	23.0	15.0	9.7	0.0132	15.0	13.8	0.0013	8.7

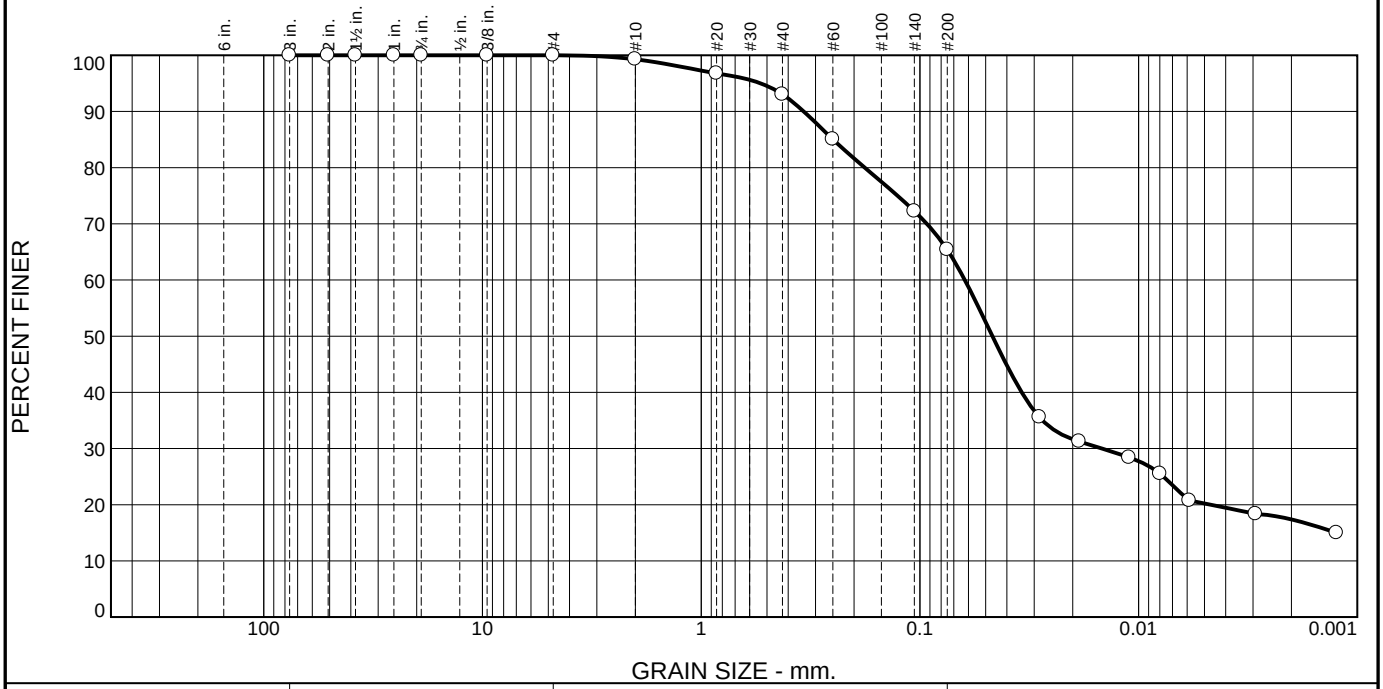
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0	0	0	0	1	11	27	39	45	16	61

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0019	0.0044	0.0085	0.0178	0.0327	0.0477	0.0712	0.2707	0.3588	0.5084	0.9482

Fineness Modulus	C_u	C_c
0.60	37.81	2.36

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	1	6	28	45	20

TEST RESULTS (ASTM D422)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100		
2	100		
1.5	100		
1	100		
.75	100		
.375	100		
#4	100		
#10	99		
#20	97		
#40	93		
#60	85		
#140	72		
#200	65		
0.0284 mm.	36		
0.0187 mm.	31		
0.0110 mm.	28		
0.0080 mm.	26		
0.0058 mm.	21		
0.0029 mm.	18		
0.0012 mm.	15		

* (no specification provided)

Material Description

sandy silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.3397 D_{85}= 0.2495 D_{60}= 0.0623
D_{50}= 0.0466 D_{30}= 0.0147 D_{15}= 0.0012
D_{10}= C_u= C_c=

Remarks

Date Received: 5/24/17 **Date Tested:** 6/2/17

Tested By: Christine Holzwarth

Checked By: Rhonda Johnson

Title: Lab Manager

Location: Sed 162
Sample Number: 10389923-009

Date Sampled: 5/23/17

Pace Analytical Services, Inc.

Billings, MT

Client: City of Hutchinson
Project: 19554

Project No: **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

6/5/2017

Client: City of Hutchinson
Project: 19554
Location: Sed 162
Sample Number: 10389923-009
Material Description: sandy silt
Sample Date: 5/23/17
Date Received: 5/24/17 **PL:** NP **LL:** NV **PI:** NP
USCS Classification: ML **AASHTO Classification:** A-4(0)
Grain Size Test Method: ASTM D422
Tested By: Christine Holzwarth **Test Date:** 6/2/17
Checked By: Rhonda Johnson **Title:** Lab Manager

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
1017.90	656.06	3	0.00	0.00	100
		2	0.00	0.00	100
		1.5	0.00	0.00	100
		1	0.00	0.00	100
		.75	0.00	0.00	100
		.375	0.00	0.00	100
		#4	0.00	0.00	100
		#10	2.57	0.00	99
68.33	0.00	#20	1.72	0.00	97
		#40	2.58	0.00	93
		#60	5.51	0.00	85
		#140	8.80	0.00	72
		#200	4.71	0.00	65

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 65
Weight of hydrometer sample =68.33
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -6
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 **-** 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	23.0	42.5	37.2	0.0132	42.5	9.3	0.0284	35.6
5.00	23.0	38.0	32.7	0.0132	38.0	10.1	0.0187	31.3
15.00	23.0	35.0	29.7	0.0132	35.0	10.6	0.0110	28.4
30.00	23.0	32.0	26.7	0.0132	32.0	11.0	0.0080	25.5
60.00	23.0	27.0	21.7	0.0132	27.0	11.9	0.0058	20.7
250.00	23.0	24.5	19.2	0.0132	24.5	12.3	0.0029	18.3
1440.00	23.0	21.0	15.7	0.0132	21.0	12.9	0.0012	15.0

Pace Analytical Services, Inc.

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer

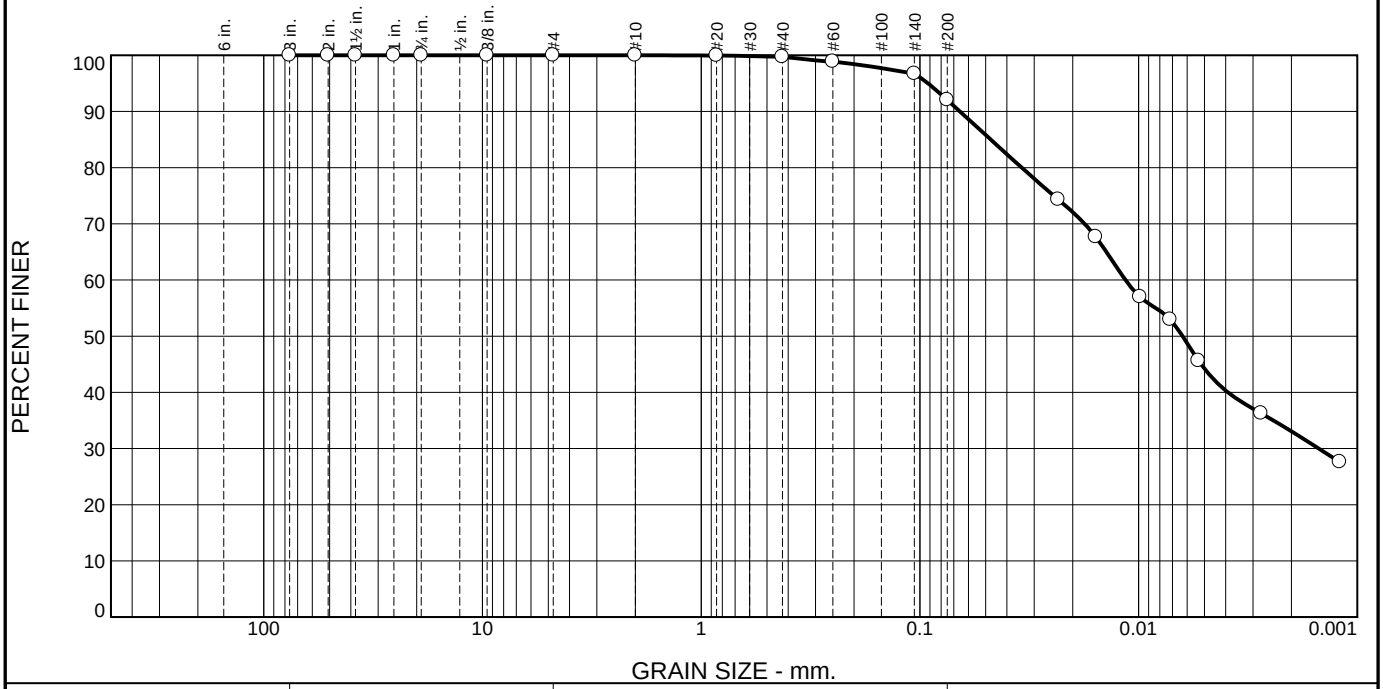
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0	0	0	0	1	6	28	35	45	20	65

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0012	0.0047	0.0147	0.0342	0.0466	0.0623	0.1787	0.2495	0.3397	0.5343

Fineness Modulus
0.41

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	8	48	44

TEST RESULTS (ASTM D422)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100		
2	100		
1.5	100		
1	100		
.75	100		
.375	100		
#4	100		
#10	100		
#20	100		
#40	100		
#60	99		
#140	97		
#200	92		
0.0233 mm.	74		
0.0157 mm.	68		
0.0099 mm.	57		
0.0072 mm.	53		
0.0053 mm.	46		
0.0028 mm.	36		
0.0012 mm.	28		

* (no specification provided)

Material Description

silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.0656 D_{85}= 0.0474 D_{60}= 0.0115
D_{50}= 0.0063 D_{30}= 0.0015 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 5/24/17 **Date Tested:** 6/2/17

Tested By: Christine Holzwarth

Checked By: Rhonda Johnson

Title: Lab Manager

Location: Sed 178
Sample Number: 10389923-010

Date Sampled: 5/23/17

Pace Analytical Services, Inc.

Billings, MT

Client: City of Hutchinson
Project: 19554

Project No: **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

6/5/2017

Client: City of Hutchinson
Project: 19554
Location: Sed 178
Sample Number: 10389923-010
Material Description: silt
Sample Date: 5/23/17
Date Received: 5/24/17 **PL:** NP **LL:** NV **PI:** NP
USCS Classification: ML **AASHTO Classification:** A-4(0)
Grain Size Test Method: ASTM D422
Tested By: Christine Holzwarth **Test Date:** 6/2/17
Checked By: Rhonda Johnson **Title:** Lab Manager

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
1278.98	587.47	3	0.00	0.00	100
		2	0.00	0.00	100
		1.5	0.00	0.00	100
		1	0.00	0.00	100
		.75	0.00	0.00	100
		.375	0.00	0.00	100
		#4	0.00	0.00	100
		#10	0.00	0.00	100
68.93	0.00	#20	0.03	0.00	100
		#40	0.17	0.00	100
		#60	0.57	0.00	99
		#140	1.50	0.00	97
		#200	3.21	0.00	92

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 92
Weight of hydrometer sample =68.93
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -6
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 **-** 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	23.0	61.0	55.7	0.0132	61.0	6.3	0.0233	74.3
5.00	23.0	56.0	50.7	0.0132	56.0	7.1	0.0157	67.7
15.00	23.0	48.0	42.7	0.0132	48.0	8.4	0.0099	57.0
30.00	23.0	45.0	39.7	0.0132	45.0	8.9	0.0072	53.0
60.00	23.0	39.5	34.2	0.0132	39.5	9.8	0.0053	45.6
250.00	23.0	32.5	27.2	0.0132	32.5	11.0	0.0028	36.3
1440.00	23.0	26.0	20.7	0.0132	26.0	12.0	0.0012	27.6

Pace Analytical Services, Inc.

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0	0	0	0	0	0	8	8	48	44	92

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0015	0.0039	0.0063	0.0115	0.0342	0.0474	0.0656	0.0918

Fineness Modulus
0.03

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

June 09, 2017

John Paulson
City of Hutchinson
111 Hassan Street SE
Hutchinson, MN 55350

RE: Project: 19554
Pace Project No.: 10389947

Dear John Paulson:
Enclosed are the analytical results for sample(s) received by the laboratory on May 24, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Some analyses have been subcontracted outside of the Pace Network. The subcontracted laboratory report has been attached.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Amanda Albrecht
amanda.albrecht@pacelabs.com
(612)607-6382
Project Manager

Enclosures

cc: Mr. Randy Devries, City of Hutchinson WWTF
Ms. Marion Graham, City of Hutchinson
Terri Olson, Barr Engineering

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: 19554
Pace Project No.: 10389947

Minnesota Certification IDs

1700 Elm Street SE, Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: UST-078
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014
Arkansas Certification #: 88-0680
California Certification #: MN00064
CNMI Saipan Certification #:MP0003
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida Certification #: E87605
Georgia Certification #: 959
Guam EPA Certification #: MN00064
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: 03086
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064
Maryland Certification #: 322
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: MN00064
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081
New Jersey Certification #: MN002
New York Certification #: 11647
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon NwTPH Certification #: MN300001
Oregon Secondary Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia Certification #: 460163
Washington Certification #: C486
West Virginia DW Certification #: 9952 C
West Virginia WW Certification #: 382
Wisconsin Certification #: 999407970
Wyoming via EPA Region 8 Certification #: 8TMS-L

Virginia Minnesota Certification ID's

315 Chestnut Street, Virginia, MN 55792
California Certification #2973
Montana Certificate #CERT0103
California Certification #2973
Alaska Certification UST-107
Alaska Certification UST-107
Alaska Certification #MN01084
Arizona Department of Health Certification #AZ0785
Minnesota Dept of Health Certification #: 027-137-445
North Dakota Certification: # R-203
Wisconsin DNR Certification # : 998027470
WA Department of Ecology Lab ID# C1007
Nevada DNR #MN010842015-1
Oklahoma Department of Environmental Quality
California Certification #2973

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: 19554
Pace Project No.: 10389947

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10389947001	**SED 86**	EPA 8082A	SNG	12	PASI-M
		EPA 6010C	DM	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		Trivalent Chromium Calculation	KEO	1	PASI-M
		EPA 350.1	DMB	1	PASI-V
		EPA 351.2	DMB	1	PASI-V
		EPA 353.2	DMB	1	PASI-V
		EPA 365.1	DMB	1	PASI-V
		EPA 9060A	CRE	4	PASI-V
10389947002	**SED 31**	EPA 8082A	SNG	12	PASI-M
		EPA 6010C	DM	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		Trivalent Chromium Calculation	KEO	1	PASI-M
		EPA 350.1	DMB	1	PASI-V
		EPA 351.2	DMB	1	PASI-V
		EPA 353.2	DMB	1	PASI-V
		EPA 365.1	DMB	1	PASI-V
		EPA 9060A	CRE	4	PASI-V

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389947

Sample: SED 86 **Lab ID: 10389947001** Collected: 05/24/17 11:50 Received: 05/24/17 15:59 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8082A GCS PCB	Analytical Method: EPA 8082A Preparation Method: EPA 3550							
PCB-1016 (Aroclor 1016)	ND	ug/kg	125	1	05/31/17 09:02	06/02/17 15:44	12674-11-2	
PCB-1221 (Aroclor 1221)	ND	ug/kg	125	1	05/31/17 09:02	06/02/17 15:44	11104-28-2	
PCB-1232 (Aroclor 1232)	ND	ug/kg	125	1	05/31/17 09:02	06/02/17 15:44	11141-16-5	
PCB-1242 (Aroclor 1242)	ND	ug/kg	125	1	05/31/17 09:02	06/02/17 15:44	53469-21-9	
PCB-1248 (Aroclor 1248)	ND	ug/kg	125	1	05/31/17 09:02	06/02/17 15:44	12672-29-6	
PCB-1254 (Aroclor 1254)	ND	ug/kg	125	1	05/31/17 09:02	06/02/17 15:44	11097-69-1	
PCB-1260 (Aroclor 1260)	ND	ug/kg	125	1	05/31/17 09:02	06/02/17 15:44	11096-82-5	
PCB-1262 (Aroclor 1262)	ND	ug/kg	125	1	05/31/17 09:02	06/02/17 15:44	37324-23-5	
PCB-1268 (Aroclor 1268)	ND	ug/kg	125	1	05/31/17 09:02	06/02/17 15:44	11100-14-4	
PCB, Total	ND	ug/kg	125	1	05/31/17 09:02	06/02/17 15:44	1336-36-3	
Surrogates								
Tetrachloro-m-xylene (S)	95	%.	41-135	1	05/31/17 09:02	06/02/17 15:44	877-09-8	
Decachlorobiphenyl (S)	92	%.	45-144	1	05/31/17 09:02	06/02/17 15:44	2051-24-3	
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050							
Arsenic	**7.2**	mg/kg	3.5	1	05/25/17 09:06	05/30/17 09:49	7440-38-2	
Cadmium	ND	mg/kg	0.53	1	05/25/17 09:06	05/30/17 09:49	7440-43-9	
Chromium	**13.4**	mg/kg	1.8	1	05/25/17 09:06	05/30/17 09:49	7440-47-3	
Copper	**16.9**	mg/kg	1.8	1	05/25/17 09:06	05/30/17 09:49	7440-50-8	
Lead	**14.7**	mg/kg	1.8	1	05/25/17 09:06	05/30/17 09:49	7439-92-1	
Nickel	**18.5**	mg/kg	3.5	1	05/25/17 09:06	05/30/17 09:49	7440-02-0	
Selenium	ND	mg/kg	3.5	1	05/25/17 09:06	05/30/17 09:49	7782-49-2	
Zinc	**60.8**	mg/kg	3.5	1	05/25/17 09:06	05/30/17 09:49	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	**0.085**	mg/kg	0.065	1	05/25/17 10:08	05/31/17 15:05	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**73.7**	%	0.10	1		05/30/17 15:42		
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation							
Chromium, Trivalent	**13.4**	mg/kg	1.0	1		06/08/17 09:10		
350.1 Ammonia	Analytical Method: EPA 350.1 Preparation Method: EPA 350.1							
Nitrogen, Ammonia	**437**	mg/kg	11.4	1	06/06/17 09:30	06/07/17 14:08	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2							
Nitrogen, Kjeldahl, Total	**6610**	mg/kg	190	1	06/06/17 09:28	06/07/17 08:35	7727-37-9	
353.2 Nitrogen, NO2/NO3	Analytical Method: EPA 353.2 Preparation Method: EPA 353.2							
Nitrogen, NO2 plus NO3	ND	mg/kg	3.8	1	06/08/17 15:15	06/09/17 10:30		N2
365.1 Phosphorus, Total	Analytical Method: EPA 365.1 Preparation Method: SM 4500P B							
Phosphorus	**580**	mg/kg	9.5	1	06/01/17 13:28	06/02/17 12:51	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389947

Sample: SED 86 **Lab ID: 10389947001** Collected: 05/24/17 11:50 Received: 05/24/17 15:59 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Total Organic Carbon	Analytical Method: EPA 9060A							
RPD%	**3.2**	%		1		05/31/17 09:32		
Total Organic Carbon	**72200**	mg/kg	6190	1		05/31/17 09:24	7440-44-0	
Total Organic Carbon	**74500**	mg/kg	5270	1		05/31/17 09:32	7440-44-0	
Mean Total Organic Carbon	**73300**	mg/kg	5730	1		05/31/17 09:32	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389947

Sample: SED 31 **Lab ID: 10389947002** Collected: 05/24/17 13:20 Received: 05/24/17 15:59 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8082A GCS PCB	Analytical Method: EPA 8082A Preparation Method: EPA 3550							
PCB-1016 (Aroclor 1016)	ND	ug/kg	109	1	05/31/17 09:02	06/02/17 16:00	12674-11-2	
PCB-1221 (Aroclor 1221)	ND	ug/kg	109	1	05/31/17 09:02	06/02/17 16:00	11104-28-2	
PCB-1232 (Aroclor 1232)	ND	ug/kg	109	1	05/31/17 09:02	06/02/17 16:00	11141-16-5	
PCB-1242 (Aroclor 1242)	ND	ug/kg	109	1	05/31/17 09:02	06/02/17 16:00	53469-21-9	
PCB-1248 (Aroclor 1248)	ND	ug/kg	109	1	05/31/17 09:02	06/02/17 16:00	12672-29-6	
PCB-1254 (Aroclor 1254)	ND	ug/kg	109	1	05/31/17 09:02	06/02/17 16:00	11097-69-1	
PCB-1260 (Aroclor 1260)	ND	ug/kg	109	1	05/31/17 09:02	06/02/17 16:00	11096-82-5	
PCB-1262 (Aroclor 1262)	ND	ug/kg	109	1	05/31/17 09:02	06/02/17 16:00	37324-23-5	
PCB-1268 (Aroclor 1268)	ND	ug/kg	109	1	05/31/17 09:02	06/02/17 16:00	11100-14-4	
PCB, Total	ND	ug/kg	109	1	05/31/17 09:02	06/02/17 16:00	1336-36-3	
Surrogates								
Tetrachloro-m-xylene (S)	98	%.	41-135	1	05/31/17 09:02	06/02/17 16:00	877-09-8	
Decachlorobiphenyl (S)	97	%.	45-144	1	05/31/17 09:02	06/02/17 16:00	2051-24-3	
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050							
Arsenic	**7.4**	mg/kg	3.2	1	05/25/17 09:06	05/30/17 09:53	7440-38-2	
Cadmium	ND	mg/kg	0.48	1	05/25/17 09:06	05/30/17 09:53	7440-43-9	
Chromium	**18.8**	mg/kg	1.6	1	05/25/17 09:06	05/30/17 09:53	7440-47-3	
Copper	**19.7**	mg/kg	1.6	1	05/25/17 09:06	05/30/17 09:53	7440-50-8	
Lead	**15.5**	mg/kg	1.6	1	05/25/17 09:06	05/30/17 09:53	7439-92-1	
Nickel	**21.3**	mg/kg	3.2	1	05/25/17 09:06	05/30/17 09:53	7440-02-0	
Selenium	ND	mg/kg	3.2	1	05/25/17 09:06	05/30/17 09:53	7782-49-2	
Zinc	**74.1**	mg/kg	3.2	1	05/25/17 09:06	05/30/17 09:53	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	**0.081**	mg/kg	0.060	1	05/25/17 10:08	05/31/17 15:07	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**69.7**	%	0.10	1		05/30/17 15:42		
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation							
Chromium, Trivalent	**18.8**	mg/kg	1.0	1		06/08/17 09:10		
350.1 Ammonia	Analytical Method: EPA 350.1 Preparation Method: EPA 350.1							
Nitrogen, Ammonia	**455**	mg/kg	9.9	1	06/06/17 09:30	06/07/17 14:13	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2							
Nitrogen, Kjeldahl, Total	**3730**	mg/kg	165	1	06/06/17 09:28	06/07/17 08:41	7727-37-9	
353.2 Nitrogen, NO2/NO3	Analytical Method: EPA 353.2 Preparation Method: EPA 353.2							
Nitrogen, NO2 plus NO3	ND	mg/kg	3.3	1	06/08/17 15:15	06/09/17 10:34		N2
365.1 Phosphorus, Total	Analytical Method: EPA 365.1 Preparation Method: SM 4500P B							
Phosphorus	**566**	mg/kg	8.2	1	06/01/17 13:28	06/02/17 12:54	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: 19554
Pace Project No.: 10389947

Sample: SED 31 **Lab ID: 10389947002** Collected: 05/24/17 13:20 Received: 05/24/17 15:59 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Total Organic Carbon	Analytical Method: EPA 9060A							
RPD%	**71.7**	%		1		05/31/17 10:16		
Total Organic Carbon	**33600**	mg/kg	5630	1		05/31/17 10:08	7440-44-0	
Total Organic Carbon	**71200**	mg/kg	4480	1		05/31/17 10:16	7440-44-0	
Mean Total Organic Carbon	**52400**	mg/kg	5050	1		05/31/17 10:16	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389947

QC Batch: 476107 Analysis Method: EPA 7471B
QC Batch Method: EPA 7471B Analysis Description: 7471B Mercury Solids
Associated Lab Samples: 10389947001, 10389947002

METHOD BLANK: 2595595 Matrix: Solid
Associated Lab Samples: 10389947001, 10389947002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	ND	0.019	05/31/17 14:10	

LABORATORY CONTROL SAMPLE: 2595596

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	.5	0.49	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2595597 2595598

Parameter	Units	10389977002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Mercury	mg/kg	19.7	.61	.63	25.9	40.4	1010	3270	75-125	44	M6,R1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389947

QC Batch: 476099 Analysis Method: EPA 6010C
QC Batch Method: EPA 3050 Analysis Description: 6010C Solids
Associated Lab Samples: 10389947001, 10389947002

METHOD BLANK: 2595561 Matrix: Solid
Associated Lab Samples: 10389947001, 10389947002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	ND	1.0	05/30/17 08:45	
Cadmium	mg/kg	ND	0.15	05/30/17 08:45	
Chromium	mg/kg	ND	0.50	05/30/17 08:45	
Copper	mg/kg	ND	0.50	05/30/17 08:45	
Lead	mg/kg	ND	0.50	05/30/17 08:45	
Nickel	mg/kg	ND	1.0	05/30/17 08:45	
Selenium	mg/kg	ND	1.0	05/30/17 08:45	
Zinc	mg/kg	ND	1.0	05/30/17 08:45	

LABORATORY CONTROL SAMPLE: 2595562

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	47.6	50.1	105	80-120	
Cadmium	mg/kg	47.6	48.1	101	80-120	
Chromium	mg/kg	47.6	47.8	100	80-120	
Copper	mg/kg	47.6	48.6	102	80-120	
Lead	mg/kg	47.6	50.5	106	80-120	
Nickel	mg/kg	47.6	48.6	102	80-120	
Selenium	mg/kg	47.6	49.5	104	80-120	
Zinc	mg/kg	47.6	51.7	109	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2595563 2595564

Parameter	Units	10389923001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Arsenic	mg/kg	9.2	150	141	159	149	100	99	75-125	7	
Cadmium	mg/kg	0.51	150	141	144	134	96	95	75-125	7	
Chromium	mg/kg	22.2	150	141	170	157	98	96	75-125	7	
Copper	mg/kg	21.5	150	141	168	157	98	96	75-125	7	
Lead	mg/kg	15.4	150	141	159	149	96	94	75-125	7	
Nickel	mg/kg	21.4	150	141	160	150	93	91	75-125	7	
Selenium	mg/kg	ND	150	141	146	139	97	97	75-125	5	
Zinc	mg/kg	90.8	150	141	246	230	103	98	75-125	7	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389947

QC Batch: 476766
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 10389947001, 10389947002

SAMPLE DUPLICATE: 2599200

Parameter	Units	10389966002 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	16.8	14.6	14	

SAMPLE DUPLICATE: 2599237

Parameter	Units	10389923008 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	55.0	52.6	4	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389947

QC Batch: 476949 Analysis Method: EPA 8082A
QC Batch Method: EPA 3550 Analysis Description: 8082A GCS PCB
Associated Lab Samples: 10389947001, 10389947002

METHOD BLANK: 2599709 Matrix: Solid
Associated Lab Samples: 10389947001, 10389947002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
PCB-1016 (Aroclor 1016)	ug/kg	ND	33.0	06/02/17 09:40	
PCB-1221 (Aroclor 1221)	ug/kg	ND	33.0	06/02/17 09:40	
PCB-1232 (Aroclor 1232)	ug/kg	ND	33.0	06/02/17 09:40	
PCB-1242 (Aroclor 1242)	ug/kg	ND	33.0	06/02/17 09:40	
PCB-1248 (Aroclor 1248)	ug/kg	ND	33.0	06/02/17 09:40	
PCB-1254 (Aroclor 1254)	ug/kg	ND	33.0	06/02/17 09:40	
PCB-1260 (Aroclor 1260)	ug/kg	ND	33.0	06/02/17 09:40	
PCB-1262 (Aroclor 1262)	ug/kg	ND	33.0	06/02/17 09:40	
PCB-1268 (Aroclor 1268)	ug/kg	ND	33.0	06/02/17 09:40	
Decachlorobiphenyl (S)	%.	93	45-144	06/02/17 09:40	
Tetrachloro-m-xylene (S)	%.	99	41-135	06/02/17 09:40	

LABORATORY CONTROL SAMPLE: 2599710

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
PCB-1016 (Aroclor 1016)	ug/kg	667	658	99	57-125	
PCB-1260 (Aroclor 1260)	ug/kg	667	631	95	57-125	
Decachlorobiphenyl (S)	%.			97	45-144	
Tetrachloro-m-xylene (S)	%.			103	41-135	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2599812 2599813

Parameter	Units	10390164005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
PCB-1016 (Aroclor 1016)	ug/kg	ND	719	718	691	696	96	97	33-125	1	
PCB-1260 (Aroclor 1260)	ug/kg	ND	719	718	668	658	93	92	37-125	1	
Decachlorobiphenyl (S)	%.						94	95	45-144		
Tetrachloro-m-xylene (S)	%.						98	99	41-135		

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389947

QC Batch: 115562 Analysis Method: EPA 350.1
QC Batch Method: EPA 350.1 Analysis Description: 350.1 Ammonia
Associated Lab Samples: 10389947001, 10389947002

METHOD BLANK: 455700 Matrix: Solid
Associated Lab Samples: 10389947001, 10389947002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Ammonia	mg/kg	ND	3.0	06/07/17 13:51	

LABORATORY CONTROL SAMPLE: 455699

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/kg	300	296	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 455701 455702

Parameter	Units	10389923001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrogen, Ammonia	mg/kg	484	899	899	1480	1380	110	100	90-110	7	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 455703 455704

Parameter	Units	10390324001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrogen, Ammonia	mg/kg	ND	483	483	492	486	101	100	90-110	1	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389947

QC Batch: 115556 Analysis Method: EPA 351.2
QC Batch Method: EPA 351.2 Analysis Description: 351.2 TKN
Associated Lab Samples: 10389947001, 10389947002

METHOD BLANK: 455684 Matrix: Solid
Associated Lab Samples: 10389947001, 10389947002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Kjeldahl, Total	mg/kg	ND	50.0	06/07/17 08:08	

LABORATORY CONTROL SAMPLE: 455683

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/kg	1000	982	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 455685 455686

Parameter	Units	1288182029 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrogen, Kjeldahl, Total	mg/kg	286	1300	1300	1530	1530	96	96	90-110	0	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 455687 455688

Parameter	Units	1288182039 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrogen, Kjeldahl, Total	mg/kg	1970	1230	1230	3210	3210	101	101	90-110	0	E

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389947

QC Batch: 115893 Analysis Method: EPA 353.2
QC Batch Method: EPA 353.2 Analysis Description: 353.2 Nitrate + Nitrite
Associated Lab Samples: 10389947001, 10389947002

METHOD BLANK: 457377 Matrix: Solid
Associated Lab Samples: 10389947001, 10389947002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/kg	ND	1.0	06/09/17 10:28	N2

LABORATORY CONTROL SAMPLE: 457376

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/kg	20	20.3	102	90-110	N2

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 457378 457379

Parameter	Units	10389947001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrogen, NO2 plus NO3	mg/kg	ND	75.2	75.5	70.7	71.1	90	91	90-110	1	N2

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 457381 457382

Parameter	Units	10389923010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrogen, NO2 plus NO3	mg/kg	ND	52.9	53.2	51.2	51.1	93	92	90-110	0	N2

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389947

QC Batch: 115240 Analysis Method: EPA 365.1
QC Batch Method: SM 4500P B Analysis Description: 365.1 Phosphorus, Total
Associated Lab Samples: 10389947001, 10389947002

METHOD BLANK: 454559 Matrix: Solid
Associated Lab Samples: 10389947001, 10389947002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Phosphorus	mg/kg	ND	2.5	06/02/17 12:45	

LABORATORY CONTROL SAMPLE: 454558

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/kg	25	25.5	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 454560 454561

Parameter	Units	10390324001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Phosphorus	mg/kg	1960	40.3	40.3	2300	2270	860	780	90-110	1	P6

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 454562 454563

Parameter	Units	10389923008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Phosphorus	mg/kg	902	55.5	55.5	694	697	-375	-370	90-110	0	P6,R1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 19554
Pace Project No.: 10389947

QC Batch: 114962 Analysis Method: EPA 9060A
QC Batch Method: EPA 9060A Analysis Description: 9060 TOC Average
Associated Lab Samples: 10389947001, 10389947002

METHOD BLANK: 453675 Matrix: Solid
Associated Lab Samples: 10389947001, 10389947002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/kg	ND	300	05/31/17 09:02	

LABORATORY CONTROL SAMPLE: 453676

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mean Total Organic Carbon	mg/kg	5820	4610	79	49-151	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 453677 453678

Parameter	Units	10389947001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Mean Total Organic Carbon	mg/kg	73300	57600	56700	138000	137000	112	113	70-130	1	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 19554
Pace Project No.: 10389947

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis
PASI-V	Pace Analytical Services - Virginia

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
N2	The lab does not hold NELAC/TNI accreditation for this parameter.
P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.
R1	RPD value was outside control limits.

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 19554
Pace Project No.: 10389947

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10389947001	**SED 86**	EPA 3550	476949	EPA 8082A	477510
10389947002	**SED 31**	EPA 3550	476949	EPA 8082A	477510
10389947001	**SED 86**	EPA 3050	476099	EPA 6010C	476493
10389947002	**SED 31**	EPA 3050	476099	EPA 6010C	476493
10389947001	**SED 86**	EPA 7471B	476107	EPA 7471B	476781
10389947002	**SED 31**	EPA 7471B	476107	EPA 7471B	476781
10389947001	**SED 86**	ASTM D2974	476766		
10389947002	**SED 31**	ASTM D2974	476766		
10389947001	**SED 86**	ASTM D422	477826		
10389947002	**SED 31**	ASTM D422	477826		
10389947001	**SED 86**	Trivalent Chromium Calculation	478580		
10389947002	**SED 31**	Trivalent Chromium Calculation	478580		
10389947001	**SED 86**	EPA 350.1	115562	EPA 350.1	115855
10389947002	**SED 31**	EPA 350.1	115562	EPA 350.1	115855
10389947001	**SED 86**	EPA 351.2	115556	EPA 351.2	115572
10389947002	**SED 31**	EPA 351.2	115556	EPA 351.2	115572
10389947001	**SED 86**	EPA 353.2	115893	EPA 353.2	115982
10389947002	**SED 31**	EPA 353.2	115893	EPA 353.2	115982
10389947001	**SED 86**	SM 4500P B	115240	EPA 365.1	115426
10389947002	**SED 31**	SM 4500P B	115240	EPA 365.1	115426
10389947001	**SED 86**	EPA 9060A	114962		
10389947001	**SED 86**	EPA 9060A	114963		
10389947002	**SED 31**	EPA 9060A	114962		
10389947002	**SED 31**	EPA 9060A	114963		

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

1038 9947

Page: 1 of 1

Section A Required Client Information:

Company:	City of Hutchinson
Address:	111 Hassan Street SE Hutchinson, MN 55350
Email To:	jpaulson@ci.hutchinson.mn.us
Phone:	320-234-5682 Fax: n/a
Requested Due Date/TAT:	Standard 10 day

Section B Required Project Information:

Report To:	John Paulson
Copy To:	
Purchase Order No.:	19554
Project Name:	
Project Number:	

Section C Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	00036446 by Adam Krieger
Pace Project Manager:	Timothy Sandager, 612-607-6456
Pace Profile #:	37715 #1

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MN

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Y/N	Analysis Test: *Metals by 6010	Mercury by 7471	Moisture	Hexavalent Chromium	Trivalent Chromiun (calculation)	Phosphorus	Nitrate + Nitrite	Ammonia	TKN	PCBs	TOC	Grain Size Hydrometer	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	SED 86	SL	G	*	*	5/24/17	11:50		6	X									X	X	X	X	X	X	X	X	X		001
2	SED 31	SL	G	*	*	5/24/17	13:20		6	X									X	X	X	X	X	X	X	X	X		002
3		SL	G	*	*														X	X	X	X	X	X	X	X	X		
4		SL	G	*	*														X	X	X	X	X	X	X	X	X		
5		SL	G	*	*														X	X	X	X	X	X	X	X	X		
6		SL	G	*	*														X	X	X	X	X	X	X	X	X		
7		SL	G	*	*														X	X	X	X	X	X	X	X	X		
8		SL	G	*	*														X	X	X	X	X	X	X	X	X		
9		SL	G	*	*														X	X	X	X	X	X	X	X	X		
10		SL	G	*	*														X	X	X	X	X	X	X	X	X		
11		SL	G	*	*																								
12		SL	G	*	*																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*Metals by 6010 = As, Cd, Cr, Cu, Pb, Ni, Se, Zn.	John W. Juntilla (Barr)	5-24-17	15:05	UPS Pace/PACE	5/24/17	15:59	8.9	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: John W Juntilla

SIGNATURE of SAMPLER: John W Juntilla DATE Signed (MM/DD/YY): 5-24-17

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 19Dec2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.20**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: City of Hutchinson

Project #: WO#: 10389947

10389947

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☒ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number:

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☒ Other: PB **Temp Blank?** ☒ Yes ☐ No

Thermometer Used: ☒ 151401163 ☐ 151401164 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 8.4 **Cooler Temp Corrected (°C):** 8.4 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ N/A

Temp should be above freezing to 6°C **Correction Factor:** true **Date and Initials of Person Examining Contents:** CS 5/24/17

USDA Regulated Soil (☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☒ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☒ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☒ Yes	☐ No		1.
Chain of Custody Filled Out?	☒ Yes	☐ No		2.
Chain of Custody Relinquished?	☒ Yes	☐ No		3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No		5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No		6.
Rush Turn Around Time Requested?	☐ Yes	☒ No		7.
Sufficient Volume?	☒ Yes	☐ No		8.
Correct Containers Used?	☒ Yes	☐ No		9.
-Pace Containers Used?	☐ Yes	☒ No		
Containers Intact?	☒ Yes	☐ No		10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☒ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: SL	☐ Yes	☒ No		12. SED 86 from COC is labled as SED 87, same time/Date
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☒ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH Positive for Res. Chlorine? Y N
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☒ N/A	Sample #
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin.	☐ Yes	☐ No	☒ N/A	Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: **Date:** 05/24/17

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Intra-Regional Chain of Custody

Pace Analytical
www.pacelabs.com

Workorder: 10389947 **Workorder Name:** SOIL TESTING **Owner Received Date:** 5/24/2017 **Due Date:** 6/8/2017

Received at:	Send To Lab:
Pace Analytical Minnesota 1700 Elm Street Suite 200 Minneapolis, MN 55414 Phone (612)607-6382	Pace Analytical Billings MT 150 N Ninth Street Billings, MT 59101 Phone (406)254-7226

Report To:
Amanda Albrecht

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: Other	Requested Analysis: ASTM D422	LAB USE ONLY
1	SED 86	PS	5/24/2017 11:50	10389947001	Solid		X	
2	SED 31	PS	5/24/2017 13:20	10389947002	Solid		X	
3								
4								
5								

Transfers	Released By	Date/Time	Received By	Date/Time
1	[signature]	5/24/17 1130		
2	Fed Ex		MWalter - Pace	6/5/17 1300
3				
4				

Comments

Cooler Temperature on Receipt 2-8 °C | Custody Seal (Y) or N | Received on Ice (Y) or N | Samples Intact (Y) or N

****In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.*

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 18May2017 Page 1 of 1
	Document No.: **F-MT-C-184-Rev.12**	Issuing Authority: Pace Montana Quality Office

Sample Condition Upon Receipt

Client Name: Pace-MN

Project #: 10389947

Courier: ☐Fed Ex ☐UPS ☐USPS ☐Client ☐Commercial ☐Pace ☐Other:

Tracking Number: 7186 9267 7000

Custody Seal on Cooler/Box Present? ☒Yes ☐No **Seals Intact?** ☒Yes ☐No **Optional:** Proj. Due Date: Proj. Name:

Packing Material: ☒Bubble Wrap ☐Bubble Bags ☐None ☐Other: **Temp Blank?** ☒Yes ☐No

Thermometer Used: ☒160285052 ☐140279186 **Type of Ice:** ☒Wet ☐Blue ☐None ☐Samples on ice, cooling process has begun

Cooler Temp Read: 2.4

Cooler Temp Corrected: 2.8

Date and Initials of Person Examining Contents: MW 6/5/17

Biological Tissue Frozen? ☐Yes ☒No

USDA Regulated Soil ☐Yes ☐No

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA? Check maps & Circle State

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐Yes ☐No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				Comments:
Chain of Custody Present?	☒Yes	☐No	☐N/A	1.
Chain of Custody Filled Out?	☒Yes	☐No	☐N/A	2.
Chain of Custody Relinquished?	☒Yes	☐No	☐N/A	3.
Sampler Name and Signature on COC?	☐Yes	☒No	☐N/A	4.
Samples Arrived within Hold Time?	☒Yes	☐No	☐N/A	5.
Short Hold Time Analysis (<72 hr)?	☐Yes	☒No	☐N/A	6.
Rush Turn Around Time Requested?	☐Yes	☒No	☐N/A	7.
Sufficient Volume?	☒Yes	☐No	☐N/A	8.
Correct Containers Used?	☒Yes	☐No	☐N/A	9.
-Pace Containers Used?	☒Yes	☐No	☐N/A	
Containers Intact?	☒Yes	☐No	☐N/A	10.
Filtered Volume Received for Dissolved Tests? Note if sediment is visible in the dissolved container.	☐Yes	☐No	☒N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: Soil	☒Yes	☐No	☐N/A	12.
All containers needing acid/base preservation have been checked?	☐Yes	☐No	☒N/A	13. ☐HNO_3 ☐H_2SO_4 ☐NaOH ☐HCl Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☐Yes	☐No	☒N/A	
Exceptions: VOA, Coliform, TOC, Oil and Grease, WI-DRO (water)	☐Yes	☒No		Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐Yes	☐No	☒N/A	14.
Trip Blank Present?	☐Yes	☐No	☒N/A	15.
Trip Blank Custody Seals Present?	☐Yes	☐No	☒N/A	
Pace Trip Blank Lot # (if purchased): NA				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐Yes ☐No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: Amanda J Albrecht **Date:** 6/5/17

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

07-Jun-2017

Timothy Sandager
Pace Analytical
1700 Elm Street
Suite 200
Minneapolis, MN 55414

Re: **Soil Testing** Work Order: **17051562**

Dear Timothy,

ALS Environmental received 2 samples on 26-May-2017 09:30 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 9.

If you have any questions regarding this report, please feel free to contact me.

Sincerely,

Electronically approved by: Chad Whelton

Chad Whelton
Project Manager

Certificate No: MN 998501

ALS Group, USA

Date: 07-Jun-17

Client: Pace Analytical
Project: Soil Testing
Work Order: **17051562**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
17051562-01	SED 86	Solid		5/24/2017 11:50	5/26/2017 09:30	☐
17051562-02	SED 31	Solid		5/24/2017 13:20	5/26/2017 09:30	☐

Client: Pace Analytical
Project: Soil Testing
WorkOrder: **17051562**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
% of sample	Percent of Sample
mg/Kg-dry	Milligrams per Kilogram Dry Weight

ALS Group, USA

Date: *07-Jun-17*

Client: Pace Analytical
Project: Soil Testing
Sample ID: SED 86
Collection Date: 5/24/2017 11:50 AM

Work Order: 17051562
Lab ID: 17051562-01
Matrix: SOLID

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
CHROMIUM, HEXAVALENT			**SW7196A**	Prep: SW3060A 6/1/17 20:00		Analyst: **MB**
Chromium, Hexavalent	ND		3.5	mg/Kg-dry	1	6/2/2017 05:00 PM
MOISTURE			**SW3550C**			Analyst: **EDL**
Moisture	**73**		**0.050**	**% of sample**	1	5/30/2017 03:49 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *07-Jun-17*

Client: Pace Analytical
Project: Soil Testing
Work Order: 17051562
Sample ID: SED 31
Lab ID: 17051562-02
Collection Date: 5/24/2017 01:20 PM
Matrix: SOLID

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
CHROMIUM, HEXAVALENT			**SW7196A**	Prep: SW3060A 6/1/17 20:00		Analyst: **MB**
Chromium, Hexavalent	ND		3.1	mg/Kg-dry	1	6/2/2017 05:00 PM
MOISTURE			**SW3550C**			Analyst: **EDL**
Moisture	**70**		**0.050**	**% of sample**	1	5/30/2017 03:49 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

QC BATCH REPORT

Batch ID: **102758** Instrument ID **WETCHEM** Method: **SW7196A**

MBLK	Sample ID: **MBLK-102758-102758**				Units: **mg/Kg**			Analysis Date: **6/2/2017 05:00 PM**			
Client ID:	Run ID: **WETCHEM_170602O**				SeqNo: **4461557**			Prep Date: **6/1/2017**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chromium, Hexavalent	ND	1.0									

LCS	Sample ID: **LCS-102758-102758**				Units: **mg/Kg**			Analysis Date: **6/2/2017 05:00 PM**			
Client ID:	Run ID: **WETCHEM_170602O**				SeqNo: **4461558**			Prep Date: **6/1/2017**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chromium, Hexavalent	4.44	1.0	5	0	88.8	80-120	0				

MS	Sample ID: **1706088-01A MS**				Units: **mg/Kg**			Analysis Date: **6/2/2017 05:00 PM**			
Client ID:	Run ID: **WETCHEM_170602O**				SeqNo: **4461569**			Prep Date: **6/1/2017**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chromium, Hexavalent	4.402	1.1	5.747	-0.1023	78.4	75-125	0				

MS	Sample ID: **1706088-01A MSI**				Units: **mg/Kg**			Analysis Date: **6/2/2017 05:00 PM**			
Client ID:	Run ID: **WETCHEM_170602O**				SeqNo: **4461571**			Prep Date: **6/1/2017**		DF: **100**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chromium, Hexavalent	3308	110	3181	-0.1023	104	75-125	0				

MSD	Sample ID: **1706088-01A MSD**				Units: **mg/Kg**			Analysis Date: **6/2/2017 05:00 PM**			
Client ID:	Run ID: **WETCHEM_170602O**				SeqNo: **4461570**			Prep Date: **6/1/2017**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chromium, Hexavalent	4.352	1.1	5.682	-0.1023	78.4	75-125	4.402	1.14	20		

The following samples were analyzed in this batch:

17051562-01A	17051562-02A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Pace Analytical
Work Order: 17051562
Project: Soil Testing

QC BATCH REPORT

Batch ID: **R212923** Instrument ID **MOIST** Method: **SW3550C**

MBLK Sample ID: **WBLKS-R212923** Units: **% of sample** Analysis Date: **5/30/2017 03:49 PM**
Client ID: Run ID: **MOIST_170530B** SeqNo: **4456112** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	ND	0.050								

LCS Sample ID: **LCS-R212923** Units: **% of sample** Analysis Date: **5/30/2017 03:49 PM**
Client ID: Run ID: **MOIST_170530B** SeqNo: **4456111** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	100	0.050	100	0	100	99.5-100.5	0			

DUP Sample ID: **17051575-08B DUP** Units: **% of sample** Analysis Date: **5/30/2017 03:49 PM**
Client ID: Run ID: **MOIST_170530B** SeqNo: **4456099** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	20.62	0.050	0	0	0	0-0	20.19	2.11	5	

DUP Sample ID: **17051586-01B DUP** Units: **% of sample** Analysis Date: **5/30/2017 03:49 PM**
Client ID: Run ID: **MOIST_170530B** SeqNo: **4456102** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	37.4	0.050	0	0	0	0-0	39.31	4.98	5	

The following samples were analyzed in this batch:

17051562-01A	17051562-02A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

17051562

Chain of Custody

Pace Analytical®
www.pacelabs.com

Workorder: 10389947 **Workorder Name:** SOIL TESTING **Results Requested By:** 6/8/2017

Report / Invoice To	Subcontract To
Timothy Sandager Pace Analytical Minnesota 1700 Elm Street Suite 200 Minneapolis, MN 55414 Phone (612)607-6456 Email: timothy.sandager@pacelabs.com	P.O._____

State of Sample Origin: MN

Item	Sample ID	Collect Date/Time	Lab ID	Matrix	Preserved Containers: Unpreserved	Requested Analysis: 1,4 Ifex Chromium	LAB USE ONLY
1	SED 86	5/24/2017 11:50	10389947001	Solid		X	
2	SED 31	5/24/2017 13:20	10389947002	Solid		X	
3							
4							
5							

Transfers	Released By	Date/Time	Received By	Date/Time
1	[signature] Pace	5/25/17 1430	[signature]	5/26/17 0930
2				
3				

Comments

Cooler Temperature on Receipt 4.0 °C | Custody Seal Y or N | Received on Ice Y or N | Samples Intact Y or N

SDZ

ALS Group, USA

Sample Receipt Checklist

Client Name: **PACE_MN** Date/Time Received: **26-May-17 09:30**

Work Order: **17051562** Received by: **DS**

Checklist completed by Diane Shaw (eSignature) 26-May-17 (Date) Reviewed by: Chad Whelton (eSignature) 26-May-17 (Date)

Matrices: Solid

Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	4.0/4.0 c	SR2	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	5/26/2017 12:30:39 PM		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑
pH adjusted?	Yes ☐	No ☐	N/A ☑
pH adjusted by:	-		

Login Notes:

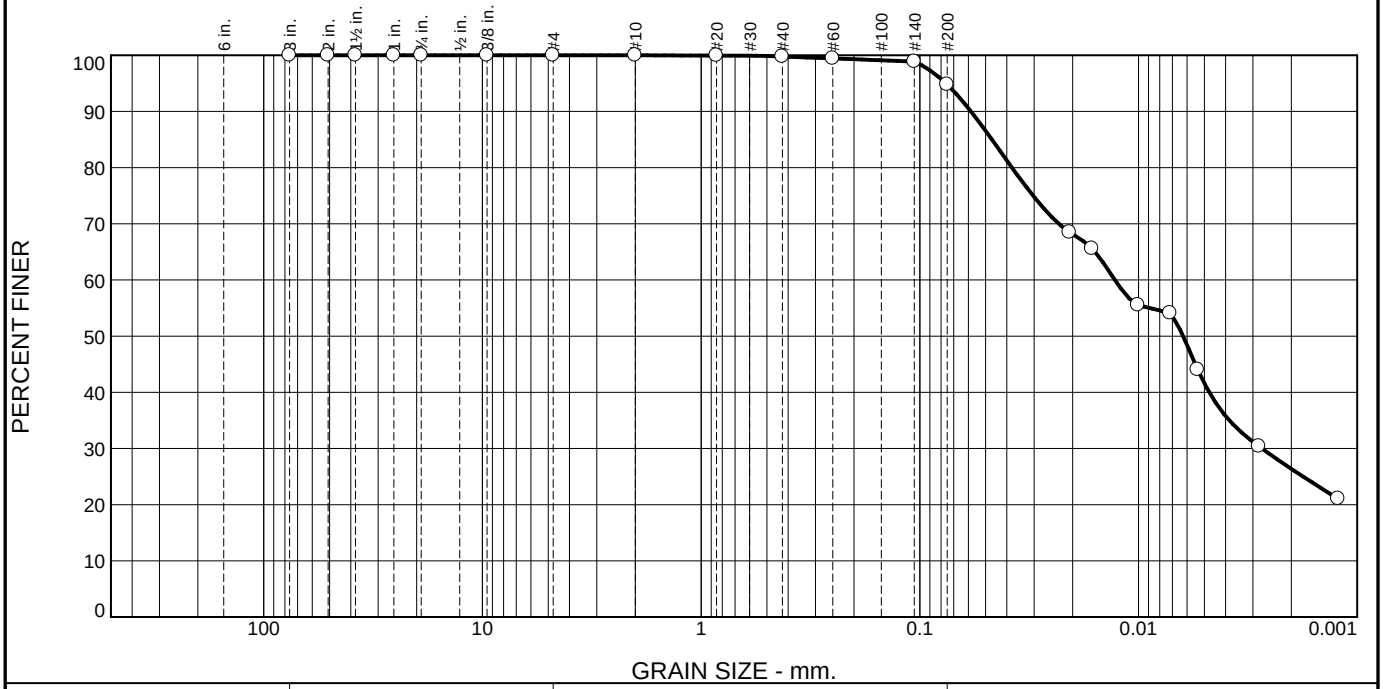
Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction:

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	5	53	42

TEST RESULTS (ASTM D422)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100		
2	100		
1.5	100		
1	100		
.75	100		
.375	100		
#4	100		
#10	100		
#20	100		
#40	100		
#60	99		
#140	99		
#200	95		
0.0206 mm.	68		
0.0163 mm.	66		
0.0101 mm.	56		
0.0072 mm.	54		
0.0054 mm.	44		
0.0028 mm.	30		
0.0012 mm.	21		

* (no specification provided)

Material Description

silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.0584 D_{85}= 0.0468 D_{60}= 0.0128
D_{50}= 0.0062 D_{30}= 0.0027 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 5/24/17 **Date Tested:** 6/8/17

Tested By: Christine Holzwarth

Checked By: Beverly Faraday

Title: Project Manager

Location: SED 86
Sample Number: 10389947-001

Date Sampled: 5/24/17

Pace Analytical Services, Inc.

Billings, MT

Client: City of Hutchinson
Project: 19554

Project No: 10389947 **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

6/9/2017

Client: City of Hutchinson
Project: 19554
Project Number: 10389947
Location: SED 86
Sample Number: 10389947-001
Material Description: silt
Sample Date: 5/24/17
Date Received: 5/24/17 **PL:** NP **LL:** NV **PI:** NP
USCS Classification: ML **AASHTO Classification:** A-4(0)
Grain Size Test Method: ASTM D422
Tested By: Christine Holzwarth **Test Date:** 6/8/17
Checked By: Beverly Faraday **Title:** Project Manager

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
695.80	573.22	3	0.00	0.00	100
		2	0.00	0.00	100
		1.5	0.00	0.00	100
		1	0.00	0.00	100
		.75	0.00	0.00	100
		.375	0.00	0.00	100
		#4	0.00	0.00	100
		#10	0.00	0.00	100
65.96	0.00	#20	0.04	0.00	100
		#40	0.12	0.00	100
		#60	0.21	0.00	99
		#140	0.38	0.00	99
		#200	2.68	0.00	95

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 95
Weight of hydrometer sample =65.96
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -5
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 **-** 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
3.00	26.0	51.0	47.6	0.0127	51.0	7.9	0.0206	68.5
5.00	26.0	49.0	45.6	0.0127	49.0	8.3	0.0163	65.6
15.00	26.0	42.0	38.6	0.0127	42.0	9.4	0.0101	55.5
30.00	26.0	41.0	37.6	0.0127	41.0	9.6	0.0072	54.1
60.00	26.0	34.0	30.6	0.0127	34.0	10.7	0.0054	44.0
250.00	26.0	24.5	21.1	0.0127	24.5	12.3	0.0028	30.4

Pace Analytical Services, Inc.

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1440.00	26.0	18.0	14.6	0.0127	18.0	13.3	0.0012	21.0

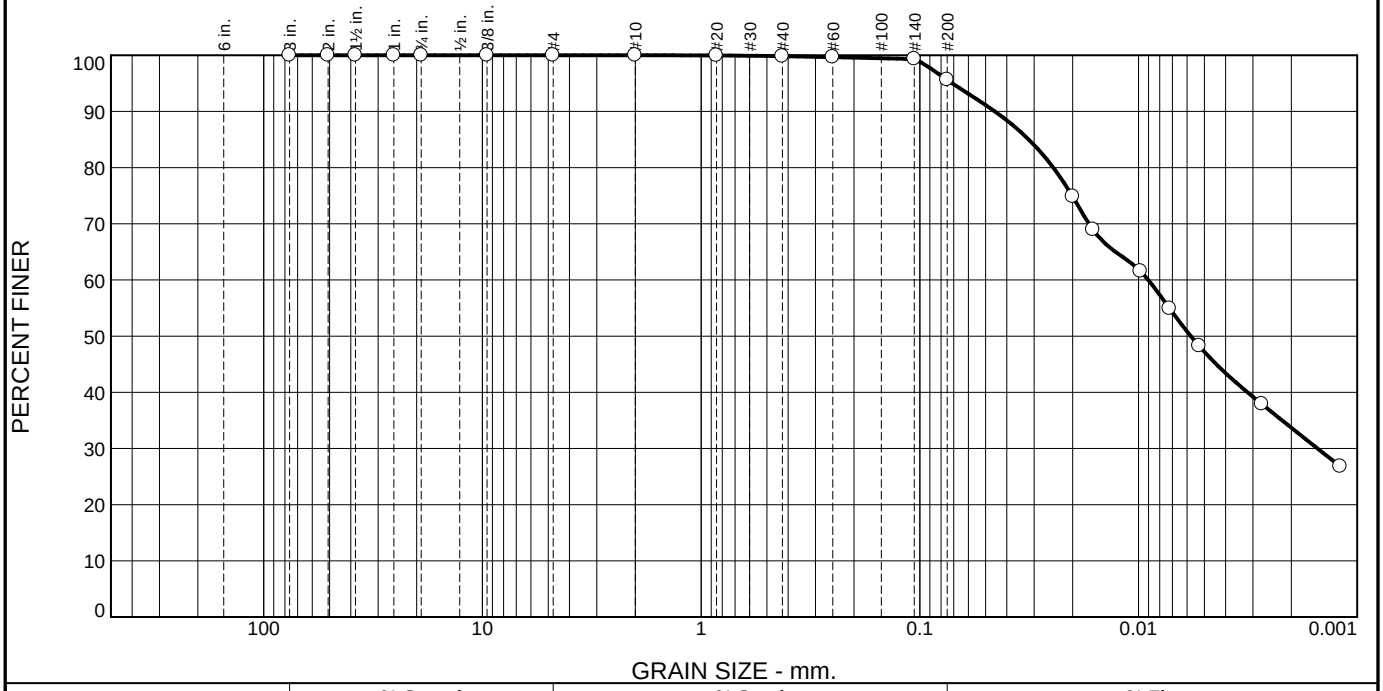
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0	0	0	0	0	0	5	5	53	42	95

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0027	0.0047	0.0062	0.0128	0.0379	0.0468	0.0584	0.0759

Fineness Modulus
0.01

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	4	49	47

TEST RESULTS (ASTM D422)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100		
2	100		
1.5	100		
1	100		
.75	100		
.375	100		
#4	100		
#10	100		
#20	100		
#40	100		
#60	100		
#140	99		
#200	96		
0.0200 mm.	75		
0.0162 mm.	69		
0.0098 mm.	62		
0.0072 mm.	55		
0.0053 mm.	48		
0.0027 mm.	38		
0.0012 mm.	27		

* (no specification provided)

Material Description

silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.0454 D_{85}= 0.0318 D_{60}= 0.0090
D_{50}= 0.0058 D_{30}= 0.0015 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 5/24/17 **Date Tested:** 6/8/17

Tested By: Christine Holzwarth

Checked By: Beverly Faraday

Title: Project Manager

Location: SED 31
Sample Number: 10389947-002

Date Sampled: 5/24/17

Pace Analytical Services, Inc.

Billings, MT

Client: City of Hutchinson
Project: 19554

Project No: 10389947 **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

6/9/2017

Client: City of Hutchinson
Project: 19554
Project Number: 10389947
Location: SED 31
Sample Number: 10389947-002
Material Description: silt
Sample Date: 5/24/17
Date Received: 5/24/17 **PL:** NP **LL:** NV **PI:** NP
USCS Classification: ML **AASHTO Classification:** A-4(0)
Grain Size Test Method: ASTM D422
Tested By: Christine Holzwarth **Test Date:** 6/8/17
Checked By: Beverly Faraday **Title:** Project Manager

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
861.32	583.08	3	0.00	0.00	100
		2	0.00	0.00	100
		1.5	0.00	0.00	100
		1	0.00	0.00	100
		.75	0.00	0.00	100
		.375	0.00	0.00	100
		#4	0.00	0.00	100
		#10	0.00	0.00	100
64.70	0.00	#20	0.02	0.00	100
		#40	0.09	0.00	100
		#60	0.11	0.00	100
		#140	0.22	0.00	99
		#200	2.39	0.00	96

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 96
Weight of hydrometer sample =64.7
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -5
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 **-** 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
3.00	26.0	54.0	50.6	0.0127	54.0	7.4	0.0200	74.9
5.00	26.0	50.0	46.6	0.0127	50.0	8.1	0.0162	68.9
15.00	26.0	45.0	41.6	0.0127	45.0	8.9	0.0098	61.5
30.00	26.0	40.5	37.1	0.0127	40.5	9.7	0.0072	54.9
60.00	26.0	36.0	32.6	0.0127	36.0	10.4	0.0053	48.2
250.00	26.0	29.0	25.6	0.0127	29.0	11.5	0.0027	37.9

Pace Analytical Services, Inc.

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1440.00	26.0	21.5	18.1	0.0127	21.5	12.8	0.0012	26.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0	0	0	0	0	0	4	4	49	47	96

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0015	0.0032	0.0058	0.0090	0.0245	0.0318	0.0454	0.0710

Fineness Modulus
0.01

Appendix E

Minnesota DNR Curly-leaf Pondweed Fact Sheet

Aquatic Invasive Species

Curly-leaf pondweed
(*Potamogeton crispus)*

What is curly-leaf pondweed?

Curly-leaf pondweed is a non-native, invasive submersed aquatic plant that was first observed in Minnesota in about 1910.

Distribution in Minnesota

Curly-leaf pondweed is known to be present in more than 750 lakes in 70 of the 87 counties in Minnesota.

How to identify it

Curly-leaf is similar in appearance to many native pondweeds commonly found in Minnesota waters. It can be distinguished from other pondweeds by its unique life cycle. It is generally the first pondweed to come up in spring and dies in mid-summer. Leaves have undulating and finely serrated edges.

Why is it a problem?

In spring, curly-leaf pondweed can interfere with recreational and other uses of lakes and rivers by producing dense mats at the water's surface. Matted curly-leaf pondweed can displace native aquatic plants. In mid-summer, curly-leaf plants usually die, and dying plants accumulate on shorelines.

In a number of Minnesota lakes, low water clarity and algal blooms are found in mid-summer after the curly-leaf pondweed dies. Recent research suggests that the invasive plant does not cause these conditions. Lake-wide treatments of curly-leaf done in multiple, consecutive years did not lead to significant increases in water clarity or native submersed plants.

Where is it a problem?

In Minnesota, Curly-leaf pondweed has caused problems in lakes by producing extensive mats in 3 to 10 feet of water. The plant is often a problem in lakes with low water clarity, mid-summer Secchi depths of three feet or less. Curly-leaf pondweed has not caused extensive problems in every body of water where it is established.

When is it a problem?

Curly-leaf may grow to problem levels in a lake one year, but not the next. This appears to be due to the weather, which can cause variations from year to year in environmental conditions in lakes.

What can be done?

Problems caused by curly-leaf can be managed by treatment with herbicides or mechanical removal of plants (see adjacent fact sheet on Best Management Practices).

How does it spread?

Curly-leaf is believed to spread from one body of water to another primarily by the unintentional transfer of plant fragments, primarily on trailered boats.

What can be done to prevent its spread?

The most important action is to remove all vegetation from your watercraft before you move it from one body of water to another.

Regulatory classification

Curly-leaf pondweed is classified as *prohibited invasive species* in Minnesota. It is illegal to possess, buy, sell, transport, and introduce a prohibited invasive species.

Best Management Practices

Curly-leaf pondweed
(*Potamogeton crispus)*

What can be done to manage curly-leaf pondweed?

Past experience in Minnesota and elsewhere has shown that eradication or elimination of curly-leaf pondweed from lakes is not a realistic goal. Problems caused by curly-leaf can be managed using available methods of control. Dense mats of curly-leaf that interfere with use of a lake can be reduced by mechanical harvesting or treatment with herbicide.

Can control of curly-leaf pondweed increase water clarity or native aquatic plants?

In the past, it was suspected that the plant was one cause of reduced clarity and algal blooms seen after the plant dies in midsummer. In attempts to increase water clarity and native plants in such lakes, the DNR and numerous partners used herbicides of curly-leaf pondweed in more than ten lakes from 2003 to 2012. Treatments reduced growth of the plant and disrupted reproduction, but water clarity was not consistently improved. Curly-leaf was reduced lake-wide, but a matching increase in native plants was not observed. In lakes with low water clarity, lake-wide control of curly-leaf pondweed in most cases appears more likely to reduce the amount of vegetation.

Mechanical control of curly-leaf

Mechanical control means to cut or pull by hand or with equipment such as rakes, cutting blades, and hand-operated or motorized trimmers. Mechanical control of large areas often uses floating, motorized harvesting machines that cut the plants and remove them from the water.

Use of herbicide to manage curly-leaf pondweed

Most treatments of curly-leaf pondweed are done with endothall herbicide. To selectively control the invasive plant, the goal is to have treatments done early in spring when water temperatures are between 50 and 60° F and are increasing.

Current BMP for curly-leaf pondweed

The most successful and cost-effective control projects involve partial-lake treatments. These treatments usually are focused on enhancement of recreational use.

Permits and technical assistance

If you would like more information on management of milfoil or other aquatic invasive species, contact the nearest Invasive Species Specialist. These staff can also help with permit applications to manage invasive aquatic plants.

Northwest MN

Park Rapids	218-699-7293
Fergus Falls	218-739-7576 ext. 254

Northeast MN

Grand Rapids	218-999-7805
Brainerd	218-833-8645

Central MN

Sauk Rapids	320-223-7847
St. Paul	651-259-5828

Southern MN

Hutchinson	320-234-2550 ext. 238
Waterville	507-362-8786

Statewide

Saint Paul	651-259-5100

Prepared by the Invasive Species Program, Ecological and Water Resources Division
Minnesota Department of Natural Resources - May 2015