Amended

REMEDIAL ACTION DESIGN REPORT

ROCK RIVER SEDIMENT REMOVAL PROJECT

JANESVILLE, WISCONSIN

BRRTS Activity # 02-54-577951

Revision 2

Prepared For:

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Table of Contents Page

FIGURES

ATTACHMENTS

"I, Daniel M. Dunn, hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Admin. Code; that this document has been prepared in accordance with the Rules of Professional Conduct in ch. A-E 8, Wis. Admin. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Admin. Code."

EXECUTIVE SUMMARY

The Former General Motors (GM) Assembly Plant (the Site) located in Janesville (Rock County), Wisconsin has been assigned WDNR Bureau for Remediation and Redevelopment Tracking System (BRRTS) Number (#) 02-54-577951. A Site Location Map and a Site Plan Aerial are provided as **Figures 1 and 2**. The Site contains sediments impacted by contaminants of potential ecological concern (COPECs), including polycyclic aromatic hydrocarbons (PAHs), lead, mercury, and polychlorinated biphenyls (PCBs), that were identified near the Adjacent Outfall where storm water from the former GM plant discharged to the Rock River north of the substation along Delavan Drive in Janesville. Information regarding the sedimentation in this reach of the Rock River was initially reported in studies completed for the City as part of the Monterey Dam demolition planning (Inter-Fluve, Inc., 2015). Multiple site investigations and evaluations were subsequently conducted by GM as documented in the *Sediment Investigation* R*eport* (GHD Report No. 21, May 2016), the *Rock River Site Investigation Report* (GHD Report No. 30, May 2017), and the *Remedial Action Options Report* (GHD Report No. 32, May 2017). Multiple lines of evidence from comprehensive studies of sediment quality impacts on local biological receptors were evaluated utilizing stastical methods and consensus-based guidance to assess potential ecological and human health exposure risks.

The project objectives and remediation goals (RGs) as outlined herein, are to mitigate potential threats (associated with sediment impacted by site-related COPECs) to the benthic invertebrate community in the vicinity of a storm water outfall to the Rock River, minimize the potential for sediment transport downstream, and assure the remedial activities do not further degrade this impaired waterway.

This Remedial Action Design Report (RADR) presents the project plans for removal of approximately 15,000 cubic yards (cys) of impacted sediment from a designated Remedial Action Area (RAA) shown on **Figure 3**. This Remedial Action Area now covers approximately 2.3 acres within the Rock River in the pool upstream from the Monterey Dam along the southern shoreline near the Adjacent Outfall. The RAA boundaries were developed to meet the risk-based project objectives that mitigate exposure to residual contaminants. Sample location SS-17 was added since the last iteration of this RADR. Sediment thickness varies from between 2 to 7 feet and is located within 3 to 8 feet of water, depending on location and seasonal river elevation (**Figures 4a through 4d**). All sediment within the remedial action area shall be removed to refusal and a certified clean fill sand blanket placed upon completion of the project.

The project layout depicted on **Figure 3** proposes hydraulically dredging the impacted sediment using a shrouded Toyo 150B dredge pump and conveyance of the sediment / river water slurry to the former GM plant for dewatering and treatment. The slurry will be conveyed through a floating hose to temporary piping installed through the box culvert at the outfall leading back to the diversion chamber located south of Delevan Drive at the former GM Site. The amended plan removes granular solids within the slurry by settling initially in a concentrator tank and followed by filtering across a drying bed. The fluids containing fine-grained particles (concentrator supernatant) will be pumped into the large steel tank (#1) for additional solids removal by settling that may include polymerization. The need for polymer will be based upon field monitoring and removal efficiencies obtained. The water fraction will be pumped into the return water tank (#2). A fraction of the settled solids containing fine particles and

organic matter will be filtered through geotextile tubes, with the ellutriant captured via drainage into a sump and recirculated back to the settling tank (Tank #1). Once removed the drying bed, solids will be placed in segregated stockpiles on plastic liner and monitored using the paint-filter liquids test (PFLT), slump test, and/or field moisture content by the microwave method using paper cups. Note that some water will be removed from the system as moisture in solids and some via transpiration from the open-top tanks during warm summer months of project activities. Water from Tank #2 will be returned to the dredge pump head as make up water for dredging activities. Excess water (any volumes exceeding the system water balance) will drain by gravity via an overflow pipe into the equalization tank (#3) for additional filtering through geotextile filters. The effluent will be sampled and discharged to either the local sanitary sewer system for additional treatment, or through granular activated carbon (GAC) prior to discharge into the River. Once dewatered, dried sediments will be characterized for proper re-use onsite or final disposal offsite, in accordance with the Sampling and Analyses Plan. Previous analytical results from sediment and porewater samples indicate the dried sediments may provide beneficial re-use as fill materials during redevelopment of the Site. A stockpile will be created south of the diversion chamber and best management practices (i.e., silt fence) will be utilized for storm water runoff protection in accordance with local and State law.

The sediment removal project is anticipated to be completed “in the wet”, including a final bathymetric survey, confirmation sampling, if any, to verify achievement of project objectives, and placement of a sand blanket over the completed sediment removal area to re-establish habitat. The project is anticipated to begin mid-summer of 2018 and dredging operations should be completed within approximately 3 to 4 months from the date of start. All project documentation will be compiled and submitted to the DNR within 60 days of completion along with a request for site closure.

We understand that the Monterey Dam may be demolished at a future date (currently uncertain). Dam demolition may alter the shoreline conditions with respect to the Ordinary High Water Mark (OHWM) that will be determined by DNR in the future. We further understand the City intends to allow re-establishment of native vegetation along the shoreline. Site conditions outside the RAA or post-demolition of the dam are outside the scope of this project.

All work will be conducted in accordance with permits from the Wisconsin Department of Natural Resources (WDNR), the Army Corps of Engineers (ACOE), and in coordination with the City of Janesville. A pre-application meeting (docket # INF-SC-2018-54-00686) was held with the WDNR and City of Janesville at the WDNR office in Janesville on March 1, 2018 to review the conceptual approach, determine draft remedial action design components for this report, review permit application requirements, and coordinate project timelines for approval and implementation. Meeting minutes were kept and a copy is included as **Attachment A**. The DNR issued a Public Notice soliciting comments until June 28, 2018. No public hearing was required since none requested by June 18, 2018.

1.0 INTRODUCTION

The Site is the Former General Motors Assembly Plant located in Janesville (Rock County), Wisconsin, and has been assigned WDNR Bureau for Remediation and Redevelopment Tracking System (BRRTS) Number (#) 02-54-577951. Sediment impacts in the Rock River were identified near the outfall of the plant's storm water discharge pipe located north of the former Assembly Facility, and immediately north of the electrical substation in Janesville as documented in the *Site Investigation Report Rock River* (RM 178.5 to 180.5) dated May 31, 2017. A *Remedial Action Options Report Rock River* (RM 178.5 to 180.5) per ch. NR 722.07 (RAOR) dated September 28, 2017 was submitted by General Motors LLC (GM).

Sediments near the Adjacent Outfall are impacted by contaminants of potential ecological concern (COPECs), including PAHs, lead, mercury, and PCBs. Storm water from the former GM plant discharged to the Rock River via this outfall north of the substation along Delavan Drive. This document proposes to mitigate impacts near the outfall based upon the evaluation of potential risks to sediment-dwelling benthic invertebrates. It should be noted that GM reported no records of releases to stormwater and the contaminants identified near the outfall may have originated from other sources and not solely from historical GM operations.

A meeting with GM, its consultants, and representatives of Jaines, LLC was held at the local WDNR office on October 24th, 2017. The Department subsequently accepted the RAOR report in a letter dated November 10, 2017. All of these documents and other resources were utilized in preparation of this Remedial Action Design Report (RADR).

A pre-application meeting (docket # INF-SC-2018-54-00686) was held with the WDNR and the City of Janesville at the local WDNR office on March 1, 2018 to review the conceptual approach, determine draft remedial action design components of the report, discuss permit application requirements, and coordinate project timelines for approval and implementation. Meeting minutes were kept and a copy is included as Attachment A.

This RADR presents the project approach and objectives for removal of approximately 15,000 cubic yards of impacted sediment from a designated remedial action area covering approximately two acres within the Rock River in the pool upstream from the Monterey Dam. All sediment within the remedial action area shall be removed to refusal or the limits of practicability, and a certified clean fill sand blanket placed upon completion of the project.

The project layout depicted on **Figure 3** proposes hydraulically dredging the impacted sediment using a shrouded Toyo 150B dredge pump and conveyance of the sediment / river water slurry to the former GM plant for dewatering and treatment. The slurry will be conveyed through a floating hose to temporary piping installed through the box culvert at the outfall leading back to the diversion chamber located south of Delevan Drive at the former GM Site. The granular solids within the slurry will be removed by settling in a concentrator tank and across a drying bed. The fluids containing fine-grained particles (concentrator supernatant) will be pumped into the large steel tank (#1) for additional solids removal by settling that may include polymerization. The water fraction will be pumped into the return water tank (#2). A fraction of the settled solids containing fine particles and organic matter will be

filtered through geotextile tubes, with the ellutriant captured and recirculated to the settling tank. Once removed the drying bed, solids will be placed in segregated stockpiles on plastic liner and monitored using the paint-filter liquids test (PFLT) by ASTM 9095B, slump test, and/or field moisture content by the microwave method using paper cups. Water from Tank #2 will be returned to the dredge pump head as make up water for dredging activities. Excess water will drain by gravity via an overflow pipe into the equalization tank (#3) for additional filtering through geotextile filters. The effluent will be sampled and compared to limits established by DNR under General Permit WI-0046558-05-0. Discharges from the tank will be pumped through granular activated carbon (GAC) prior to discharge into the River, or the local sanitary district sewer. A Soil Management Plan has been prepared to handle the sediment as solid waste through dewaterings until characterized for proper re-use onsite or final disposal offsite. . Previous analytical results from sediment and porewater samples indicate the dried sediments may provide beneficial re-use as fill materials during redevelopment of the larger former Assembly Plant parcel(s). An exemption request under NR 718.15 has concurrently been submitted to DNR and a copy is included as Appendix H. A stockpile will be created south of the diversion chamber and best management practices (i.e., silt fence) will be utilized for storm water runoff protection in accordance with local and State law.

The sediment removal project will be completed "in the wet", including placement of a sand blanket over the completed sediment removal area to re-establish habitat. The project is anticipated to begin mid-summer of 2018 and dredging operations should be completed within approximately 3 months from the date of start. All project documentation will be compiled and submitted to the DNR within 60 days of completion along with a request for site closure.

1.1 Contacts

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1.2 Site Setting

Storm water collected from the main assembly plant portion of the Property discharged to the Rock River via a permitted outfall, (Outfall 010, located north of the former GM Facility and north of the electrical substation under Wisconsin Pollutant Discharge Elimination System [WPDES] – Tier 2 General Permit No. WI-S067857-4. Discharge from Outfall 010 combines with storm water from other properties in the vicinity of the Site and discharges to the Rock River via an outfall referred to in this Report as the Adjacent Outfall (see **Figure 2**). Storm water runoff from other parts of the Property and the WWTP discharge water combine with runoff from other properties in the vicinity and discharge to the Rock River via outfalls located east (City Northeast Outfall 1) and west (City West Outfall) of the Property. The segment of the Rock River near the Site flows from east to west and ranges in width, depending on location, between 500 ft to 800 ft wide. The Rock River is listed as an impaired waterway for sediment/TSS, and phosphorous.

1.3 Nature and extent of contamination in sediments

Studies of sediment quality upstream of the Monterey Dam was performed by Inter-Fluve, Incorporated in 2015 (Inter-Fluve, Inc., 2015) and GM's consultant, GHD. GM consultants performed further investigations of the sediment conditions immediately around the Adjacent Outfall. Sediment composition is described as silt with fine sand and organics, underlain by gravel and cobbles. The *Sediment Investigation Report* (GHD Report No. 21, May 2016) and *Rock River (Mile 178.5 to 180.5) Site Investigation Report* (GHD Report No. 30, 2017) document the collection of samples and evaluation of analytical results of the Site Investigation activities. Surface water, porewater, and sediment data were collected to determine whether discharges to the Rock River from the three storm water outfalls in the Adjacent Area have affected surface water and/or sediment quality, and, if so, to then define the nature and extent of the impact.

The results from the Site Investigation showed sediment impacts have potential ecological concerns localized near the Adjacent Outfall. The highest sediment concentrations of polycyclic aromatic hydrocarbons (PAHs), metals (e.g., lead), and polychlorinated biphenyls (PCBs) are focused within an approximately 1.7-acre area around the Adjacent Outfall (as presented on Figure 6.1 of the Site Investigation Report). The concentrations of chemicals of potential ecological concern (COPECs) in sediment outside this area are generally similar to concentrations found in the upstream and downstream sediment data collected during the field investigation. These results indicate that the investigations have adequately characterized the quality of sediments in the project area with respect to the extent of the COPCs/COPECs.

The potential for unacceptable ecological risk was assessed using methods and assumptions based on

WDNR and USEPA ecological risk assessment guidance, incorporating site-specific data from the field investigation, and professional judgment. The majority of sediment samples were collected as "surface" sediments from 0 to 0.5 ft. Samples were also collected from 0.5 to 2.0 ft and composite samples of the two intervals were also submitted for several locations. Additional deeper samples were collected at several locations throughout the sediment thickness until refusal was reached. USEPA considers the top one foot of sediment as the biologically active zone. Inclusion of the two-foot sample is conservative and consistent with intervals to evaluate both ecological and human health risks. The potential impacts were evaluated through the column of sediment/soil in and below the biologically active zone near the Adjacent Outfall. The evaluation indicated only one ecological "risk driver" as being *potential impacts to the benthic invertebrate community*. The ecological risk analysis considered the presence of PAHs and metals in sediments, as well as the cumulative effects of the PAH and metals mixture under both current and future scenarios. Generally, while many samples were of no concern (Level 1), certain site-specific locations met criteria as a Level 2 Concerns (on a scale of 1 to 4, 1 being the lowest level of concern and 4 being the highest level of concern) when the result exceed the Threshold Effect Concentration (TEC) but was below the mid-point effect concentration (MEC). There were no observed or measurable affects to biota in the sample population collected. PAH toxicity to benthic organisms is likely at only one location, SS-5 (location seen on **Figure 6.1 of Appendix G**). Metal concentrations in sediments typically controlled the sensitivity of risk predictions. Methyl mercury was found in one porewater sample; however, its duplicate sample was reported as non-detect. Any adverse ecological impacts are localized with no evidence of wider impacts. Locations approaching or exceeding the Probable Effects Concentration (PEC) are addressed by this remedial plan.

The Remedial Action Area proposed herein conservatively represents an expanded 2.3-acre area as "over-excavation" to capture additional sample locations (SS-15, SS-17 and T-8), as shown on **Figure 6.1 of Appendix G**. This amended RADR captures sediment from around the SS-17 location where lead was reported at 505 mg/kg in the underlying 0.5 to 2.0 ft sample. The risks at other sample locations (SS-10 and SS-11) were initially considered, but contained elevated total organic carbon (TOC), and were excluded after normalizing the data for TOC in accordance with standard practices and DNR guidance.

1.4 Rock River Hydrodynamics

The Site is located along the southern shoreline in the pool approximately 2,400 feet southeast of the Monterey Dam. The river pool width in this area ranges from 500 to 800 feet across to the northern shoreline. The depth of water in the Remedial Action Area ranges from two to nine feet with an average depth of approximately four feet. The average monthly flowrate of the Rock River in the channel is approximately 4,000 cubic feet per second (cfs) with seasonal wet-weather peaks ranging from 7,000 to 9,000 cfs, and seasonal troughs (winter) around 1,000 cfs. There are no wetlands in the immediate vicinity of the Site surrounding the Remedial Action Area.

1.5 Threatened and Endangered Species Review

A Threatened and Endangered Species review from the *Site Investigation Report Rock River* is excerpted below. *Threatened and endangered species potentially occurring in Rock County, Wisconsin, were reviewed to identify any such species that might live in or feed from the impounded portion of the Rock River upstream of the Monterey Dam in Janesville, Wisconsin. Relevant information was obtained from federal and state web sites. Rock County, Wisconsin, has three species that are federally listed under the Endangered Species Act, according to the United States Fish and Wildlife Service (U.S. FWS), as of April 2016 (U.S. FWS 2016a). These include the eastern prairie fringed orchid (Platanthera leucophaea), prairie bush-clover (Lespedeza leptostachya), and the northern long- eared bat (Myotis septentrionalis). Two species (eastern prairie fringed orchid and prairie bush-clover) are terrestrial plant species and, therefore, do not occur in the Rock River. The northern long-eared bat is listed as federally threatened but is unlikely to occur in the Study Area given its habitat requirements. These bats require large caves or abandoned mines to overwinter, and they roost in cavities or crevices of live trees and hunt in mature forests during the summer. These habitats are not present in close proximity to the Site.*

The U.S. FWS is also proposing to list the Eastern massasauga rattlesnake (Sistrurus catenatus catenatus) as a threatened species. The whooping crane (Grus americana) is currently being reintroduced to the eastern United States and is listed as a nonessential experimental population. These two species are not likely to utilize the Rock River impoundment for critical portions of their life histories due to the lack of preferred natural habitat and frequency of human disturbances.

The State of Wisconsin lists 45 species in Rock County as threatened or endangered as of April 2016. Of these 45 species, 4 of the species might possibly occur in the Monterey Dam impoundment, including 3 fish species (pallid shiner [Hybopsis amnis], black buffalo [Ictiobus niger], redfin shiner [Lythrurus umbratilis]) and 1 mussel species (purple wartyback [Cyclonaias tuberculata]). The presence of these species cannot be definitively excluded; however, they are unlikely to occur in the area of interest. WDNR maps of the distribution of Wisconsin fish species indicate the pallid shiner, black buffalo, and redfin shiner have not been observed in Rock County over the record of their data collection, which goes back as far as 1875 in some cases. Unionid mussels, including the purple wartyback, are experiencing declines and extirpation from waterbodies around the country due to habitat modifications and water pollution. Construction of the Monterey Dam and subsequent impoundment of the Rock River is a habitat modification that could have potentially resulted in mussel population decline in the impounded area. Additionally, some Unionid mussels are highly sensitive to water pollution, including urban runoff that is typically ubiquitous near population centers such as Janesville. Unionid mussels were collected from the Monterey Dam impoundment as part of biological tissue sampling efforts. Normandeau staff identified all mussels captured. Fourteen individuals were identified as giant floaters (Pyganodon grandis), and two individuals were identified as fatmuckets (Lampsilis siliquoidea). Both species are considered widespread and common with no threatened or endangered designations. Purple wartybacks were not encountered.

1.6 Environmental Laws and Standards

The Remedial Action shall remove all impacted sediments from the Remedial Action Area to the limits of practicability. Bathymetric survey shall be completed to document the initial, intermediate, and final conditions. These surveys shall include probing to sound the river bottom. A petite ponar sampler will be dropped to collect a sample of loose material remaining on the river bed. The contents shall be visually inspected upon retrieval. Additional dredging shall be conducted if a fine-grained layer greater than two inches thick is observed and the confirmation process shall be repeated. If fine-grained material greater than two inches thick or representing more than 25% of the ponar volume is observed during a subsequent event, the fine-grained material shall be segregated by screening through a #40 sieve and submitted to the analytical laboratory for analyses of metals, polynuclear aromatic hydrocarbons (PAHs) and poly-chlorinated biphenyls (PCBs). The analytical results shall be compared to the Tables 1, 2, and 3 presented in WDNR's Consensus-Based Sediment Quality Guidelines. Any locations containing Contaminants of Potential Concern (COPECs) exceeding the Remediation Goals cited as the Probable Effect Concentration (PEC) may require additional remedial efforts.

2.0 DESIGN APPROACH

Remedial Action Objectives (RAOs) were developed to address the potential risks to benthic invertebrates within a 1.7-acre area around the Adjacent Outfall for current conditions (Figure 5.11 of the Rock River Investigation Report, GHD, 2017) see **Appendix H**). The project RAOs address both current and future scenarios for sediment. The RAOs are also stated to address the potential for mobilization of COPCs/COPECs in surface water and sediment either during or after remedial actions. RAOs for the impacted Rock River sediments include:

- Reduce risks to acceptable levels for environmental receptors from exposure to COPECs in sediments in the proposed remedial action area.
- Minimize the potential for COPECs in sediments to migrate from the proposed remedial action area to areas where potential unacceptable ecological exposures may occur.

As referenced earlier in this report, the proposed remedial action area is approximately 2.3 acres, as seen on **Figure 3**. The remedial action area was determined based on a review of the concentrations of COPECs and the potential for benthic invertebrate community risk at multiple depths as presented on Figures 6.1 and 6.2 in the Site Investigation Report (GHD, 2017). Additionally, the likelihood of toxicity is "uncertain" for two surface sediment samples collected in the immediate vicinity of the City West Outfall, but the spatial extent of "uncertain" risk in this area is very limited. Also, one of the "uncertain" samples was included in the sediment toxicity testing and it was found to not be toxic. Results were considered during an ecological risk assessment within and below the biologically active zone, resulting in the area designated as the RAA. Based on these results, only the area in the vicinity of the Adjacent Outfall requires risk management.

The remedy was designed to be effective in meeting the stated remediation goals. This plan proposes to remove all practicably recoverable sediments within the Remedial Action Area boundaries, shown on **Figure 3,** down to the gravel bed. This approach conservatively and effectively over-excavates the sediments that have been determined to be a potential threat to benthic invertebrates, both laterally and vertically.

The estimated total volume of impacted sediments within the remedial action area is approximately 15,000 cubic yards (cys). The volume estimate was determined based on the remedial action area, the most recent bathymetric surface, and the estimated sediment thickness (based on typical depth of refusal at approximately 5 to 6 ft) as presented in the *Site Investigation Report* (GHD, 2017). Figures 4a through 4d provide bathymetry data and various cross-sections of the river that were used. The actual volume of material removed may vary based upon more current bathymetry which will be completed immediately before and after dredging activities. There will be some volume of slough that will creep into the RAA external boundaries during the dredging process, thus making it difficult to more accurately predict the total volume of sediments that will be captured. The remediation goals of this

approach is intended to remediate sediment impacted by former discharges attributed to GM via the Adjacent Outfall. A sand blanket will be placed over the completed RAA. The Ordinary High Water Mark will likely change whenever dam removal occurs; however, future site conditions outside the RAA are not within the scope of this project.

2.1 Remedial Action Alternatives Evaluation and Selected Approach

GM submitted a RAOR that outlined several viable remedial approaches to address residual contamination in Rock River sediments. The RAOR included consideration of the Monterey Dam removal project with respect to timing of sediment removal.

EAG considered each of the remedial alternatives presented and selected hydraulic dredging with onsite dewatering as the least disruptive and cleanest method to meet the project objectives. The proposed sediment management methods for removal, dewatering, treatment and discharge of carriage water described herein are sufficient to meet project objectives.

2.2 Remedial Design Plan

The project layout depicted on **Figure 3** proposes hydraulically dredging the impacted sediment using a shrouded Toyo 150B dredge pump and conveyance of the sediment / river water slurry to the former GM plant for dewatering and treatment. The slurry will be conveyed through a floating hose to temporary piping installed through the box culvert at the outfall leading back to the diversion chamber located south of Delevan Drive at the former GM Site. The granular solids within the slurry will be removed by settling in a concentrator tank and across a drying bed. The fluids containing fine-grained particles (concentrator supernatant) will be pumped into the large steel tank (#1) for additional solids removal by settling that may include polymerization. The water fraction will be pumped into the return water tank (#2). A fraction of the settled solids containing fine particles and organic matter will be filtered through geotextile tubes, with the ellutriant captured and recirculated to the settling tank. The solids will be placed in stockpiles or the geotextile tubes located within an impermeable (concrete or lined) area located west and north of the former tire building. The physical properties of dewatered sediments will be monitored. Moisture content, a paint-filter test, and “slump” test will periodically be conducted to monitor the dewatering process. A composite sample will be collected from a minimum of three locations from each stockpile or tube for characterization analyses once the material approaches a “truckable” state. The material will be relocated to the designated stockpile or shipped for off-site disposal based upon the analytical results, in comparison to industrial RCLs and beneficial re-use criteria. Water from Tank #2 will be returned to the dredge pump head as make up water for dredging activities. Excess water will drain by gravity via an overflow pipe into the equalization tank (#3) for additional filtering through geotextile filters. The effluent will be sampled and discharged to either the local sanitary sewer system for additional treatment, or through granular activated carbon (GAC) prior to discharge into the River. Once dewatered, dried sediments will be characterized for proper re-use onsite or final disposal offsite, in accordance with the Sampling and Analyses Plan (SAP)/Quality assurance Project Plan (QAPP). Previous analytical results from sediment and porewater samples

indicate the dried sediments may provide beneficial re-use as fill materials during redevelopment of the Site. A stockpile will be created south of the diversion chamber and best management practices (i.e., silt fence) will be utilized for storm water runoff protection in accordance with local and State law.

The manpower and equipment required to complete tis project will generally include the dredge operator, and deck hand and another to operate boat, monitor turbidity, flows, etc. The equipment is placed on a floating barge with rail winches, 150 HP pump, GPS tracking system, and work boat. The land crew will include a project manager/HSO, two equipment operators and laborers, and others as necessary to maintain the system(s). Equipment may consist of a wheel loader. Skid steer loader with bucket, forks, and broom attachments, and perhaps a second loader with equipment operator.

The sediment removal project is anticipated to be completed "in the wet", including a final bathymetric survey, confirmation sampling, if any, to verify achievement of project objectives, and placement of a sand blanket over the completed sediment removal area to re-establish habitat. Mobilization of sediments outside the removal area will be minimized using a silt curtain and silt fence surrounding the dried sediment stockpile. A 12-inch layer of habitat-suitable media (i.e., sand) will be placed as bedding in the Rock River upon completion of dredging activities. The fill certification procedures and specifications include chemical analyses. The supplier will segregate a stockpile for this project that will be tested for project contaminants in advance of delivery to the project site. Analytical results will be shared with DNR to gain consensus on acceptability for use on the project. An independent laboratory must complete testing of the material for WisDOT certification. This material is suitable to be placed on the bottom of the Rock River from a floating platform.

The DNR requested a review of slope stability along the southern portions of the removal area appear to evaluate slope stability. This issue was reviewed with Alliant, ATC, the City, and removal contractors. We do not believe that sediment removal poses any threat to the stability of the substation structures since the towers are founded on concrete piers to rock, the substation consists of 50+ years old fill material with the relatively low loads, the shoreline is armored by broken concrete, and slopes are not as steep as represented in the cross-sections due to vertical exaggeration of the scales. Baseline, intermediate, and final bathymetric surveys will be conducted as part of the remedial actions and reviewed with respect to shoreline stability. A description of the physical and multi-beam technology used to measure the depth and thickness of sediments before, during and after sediment removal has been included in the amended RADR.

Additionally, the access to the sediment removal area will be via the end of Park Avenue. The shoreline is rocky; however, gravel may be placed within the existing roadway (and later removed per City wishes) to support equipment traversing the access route.

2.3 Preliminary testing for project performance standards

The project objectives were developed to remove potential threats to the benthic invertebrate

community in the vicinity of the Adjacent Outfall and re-establish native vegetation along the post-remedial shoreline.

The sediments in the project area were characterized by previous consultants that included grain-size distribution testing. Sediments are made of silts and fine sands with some clay and significant organic matter. An additional round of sediment sampling was completed by EAG to conduct laboratory analysis of filtered carriage water and to evaluate potential polymers that might be used to aid in solids settlement during the proposed dewatering process. A hanging bag test was conducted on March 14, 2018 to collect samples of ellutraint draining from a sample of the geotextile filter material. Two discrete and one composite sample of raw or "neat" filtered water were collected and sent to Pace Laboratories for analyses of total suspended solids (TSS), PCBs, PAHs, and RCRA metals (plus Zinc and methyl mercury). Analytical results are included in **Attachment B.**

A general outline of the start-up procedures is provided below and subject to field modification based upon site conditions at the time of project completion, Contractor equipment and preferences to meet the project objectives and permit requirements.

- Develop access to the Rock River for necessary equipment;
- Survey the RAA (both laterally and vertically) to document initial conditions, mark the RAA boundary and deploy turbidity curtains, and monitoring buoys;
- Line the dewatering/treatment area, as necessary, to provide containment of liquids through the system;
- Construct the temporary piping system through the Adjacent Outfall exiting via the former grit chamber, continuing the conveyance past the polymer dosing equipment location, into the header manifold within the dewatering area, and connecting to the initial geotextile tubes;

The start-up of the dredging operations will begin at lower flowrates (1,000 to 1,500 gallons per minute) and limited to 12 hours per day. The dredging Contractor will be permitted to increase the flowrate (to a maximum of 2,500 gpm) once the process has been optimized.

Start and kill switches are located on deck of the barge system. A service panel with shut off will be on land at the electric drop location on the west side of the substation. Two-way radios and cell phone communication will be utilized between all personnel on site.

The slurry line has a siphon break where it enters the Concentrator tank. Typical check valve back-flow preventers are less reliable since the sand could prevent closure.

The City has granted permission for 24-hr operations; however, the Contractor does not expect operations outside of daylight hours. The decision to extend the work-shifts to a 16-hr or 24-hr day may be considered if the project is delayed and/or could run into unfavorable Fall weather.

2.4 Regulatory Permit Process

Jaines, LLC has prepared permit applications in accordance with WDNR requirements. WDNR approval must be procured for the sediment removal activities, discharge of dewatering fluids, and onsite deposition of dried sediments.

2.4.1 Waterway Resources Permit for Dredging

EAG has prepared an online application (Form 3500-053) that includes joint approval by the WDNR and ACOE. A copy of the permit and recent response to comments letter are available on-line.

2.4.2 Effluent Diuscharge Permit

EAG requested coverage under the General Permit WI-0046558-05-0 for discharge of Carriage Water from Dredging Operations. A copy of the draft effluent limitations is included in **Attachment D** of the document.

2.5 Public Participation

Project documents will be made available via on-line resources. Public comments will be solicited through a Public Notice prepared by DNR. Notices may also be sent to owners of property (riparian areas) adjacent to the project, if required. An informational meeting may be held to answer any questions, should the community stake-holders strongly desire one. A Fact Sheet will be made available upon request, and a public hearing will be scheduled to hear any concerns related to implementation of the project, if required. Public participation activities will be conducted to satisfy NR 714 requirements.

2.6 Project Schedule (Updated)

Significant project planning, approvals, and preparations are part of the project mobilization phase. The project is anticipated to begin mid-summer of 2018 and dredging operations should be completed within approximately 2 to 3 months from the date of start. The fieldwork for sediment removal, treatment, and management of dried sediment is expected to take two to four months. All project documentation will be compiled and submitted to the DNR within 60 days of completion along with a request for site closure. The overall project is planned for completion within 12 months. The project schedule is estimated below and shall be updated periodically as the permit applications are processed, contractor(s) selected, and fieldwork is initiated.

Activity	Estimated Start Date	Duration (days)	Estimated Completion Date	Comments
Remedial Action Design Report and Permit applications prepared by EAG and submitted to DNR	1/19/18	90 - 120	5/25/18	
Public Notice by DNR	5/30/18	30	6/29/18	Cover all applications
Information meeting	6/13/18	1	6/13/18	Optional, *as needed*
Public Hearing	7/3/18	1	7/3/18	Optional, *as needed*
Final DNR / ACOE approval(s)	5/25/18	30 - 45	7/9/18	
Contractor Mobilization - Silt curtains - Conveyance system - Dewatering system - Start-up pilot test	7/16/18	14	7/28/18	
Dredging commences	7/30/18	60 - 90	10/19/18	Weather dependent
Contractor demobilized	10/26/18	30	11/30/18	
Sediment dewatering	7/30/18	90 - 100	11/21/18	Weather dependent
Dried sediment management	8/1/18	100-120	12/9/18	
Project documentation to DNR	7/6/19	180	1/11/19	
BRRTS Closure granted by DNR	1/14/19	60 - 90	4/12/19	
GIS Registry complete	12/2/18	120 - 180	5/24/19	

3.0 REMEDIAL ACTIONS

3.1 Hydraulic Dredging for Sediment Removal

A hydraulic dredge shall be utilized to complete the sediment removal project.

3.1.1 *Surveys*

The Remedial Action Area will be marked by Global Positioning System coordinates. A preliminary bathymetric survey of the area was conducted to establish the initial contours of the stream bed surface. Periodic surveys will be conducted throughout the project to ascertain removal of the sediment down to the river bed. The bathymetric survey shall be finalized upon completion of the project to document sediment volumes removed. The results of the survey efforts will be documented and informally shared with DNR on a regular basis, and then formally submitted to DNR in the final report.

The DNR requested a review of slope stability along the southern portions of the removal area appear to evaluate slope stability. This issue was reviewed with Alliant, ATC, the City, and removal contractors. We do not believe that sediment removal poses any threat to the stability of the substation structures since the towers are founded on concrete piers to rock, the substation consists of 50+ years old fill material with the relatively low loads, the shoreline is armored by broken concrete, and slopes are not as steep as represented in the cross-sections due to vertical exaggeration of the scales. Baseline, intermediate, and final bathymetric surveys will be conducted as part of the remedial actions and reviewed with respect to shoreline stability. A description of the physical and multi-beam technology used to measure the depth and thickness of sediments is included as an Attachment to this document.

3.1.2 Access

The dredging equipment can be launched into the river along the northern shoreline across from the Site or via the end of Park Avenue. The shoreline is rocky; however, gravel may be placed on the existing road (and later removed per City wishes) to support equipment traversing the access route. No fill will be put on the shoreline (access ramp). Use of the area at the end of Industrial Drive is available but no longer intended for use.

A crane may need to be utilized in order to transfer the dredge barge from a truck to the river. A shallow draft, typically less than 3 ft, is required to access the impacted area.

No permanent subsurface structures (wood, gravel, or concrete) are planned to support this project. Photo documentation of project activities will be collected.

3.1.3 Silt / Turbidity Curtains

The sediment removal project is anticipated to be completed "in the wet", including a final bathymetric survey, confirmation sampling, if any, to verify achievement of project objectives, and placement of a sand blanket over the completed sediment removal area to re-establish habitat. Mobilization of sediments outside the removal area will be minimized using a turbidity curtain and silt fence surrounding the dried sediment stockpile. Turbidity curtains shall conform to DNR Conservation Standard 1069 and be deployed to control the release of suspended solids and reduce or mitigate turbidity resulting from dredging operations in the RAA. The turbidity curtains shall extend from the water surface to the bottom of the river at the locations shown on **Figure 3**.

A silt curtain will be placed around the dried sediment stockpile located south of the steel tanks on the former GM property to prevent transport of solids during precipitation events.

3.1.4 Surface Water Quality Monitoring

Surface water quality monitoring shall be conducted throughout the duration of the project. Field instruments shall be utilized to monitor turbidity of the water upstream and downstream of the RAA during dredging operations. A difference of 40 NTUs between upstream and downstream readings will prompt corrective measures to the operation. Floating instruments with data-loggers and/or hand-held equipment may be used. Records shall be maintained daily and included with reports to the DNR.

3.1.5 Conveyance System and Routing

The slurry will be conveyed through a floating hose to temporary piping installed through the box culvert at the outfall leading back to the diversion chamber located south of Delevan Drive at the former GM Site. Piping will be prefabricated and inserted in the Adjacent Outfall and extend through the onsite diversion chamber where it will daylight to the ground surface. The piping will be connected by fusion welding and/or bolted couplings. Ten-inch piping and hoses will be configured to allow sampling and management of the treatment process.

3.1.6 Remedial Action Monitoring

Remedial actions shall be monitored on a daily basis through River water quality monitoring, measurement of field parameters for polymerization dosing, sampling of effluent prior to discharge, composite sampling and characterization analyses of dried sediments, as well as logs of equipment and labor utilization. A bathymetric survey of the Remedial Action Area will be conducted periodically (approximately 2-3 weeks) to track progress of remedial dredging activities.

3.2 Sediment Dewatering

The project layout depicted on **Figure 3** proposes hydraulically dredging the impacted sediment using a shrouded Toyo 150B dredge pump and conveyance of the sediment / river water slurry to the former GM plant for dewatering and treatment. The granular solids within the slurry will be removed by settling in a concentrator tank and across a drying bed. Once removed the drying bed, solids will be placed in segregated stockpiles on plastic liner and monitored using the paint-filter liquids test (PFLT), and/or field moisture content by the microwave method using paper cups. An exemption request is attached in **Attachment H** . A Soil Management Plan for the dried sediments (once characterized) to be used managed as fill soil at the site **is also part of Attachment H**. The fluids containing fine-grained particles (concentrator supernatant) will be pumped into the large steel tank (#1) for additional solids removal by settling that may include polymerization using FLOPAM EMF 240 CT PWG (SNF Holding Co.) at a dosage of up to 2.86 lbs/dry ton. No other polymer will be utilized in the process unless prior approval by WNDR is granted. The water fraction will be pumped into the return water tank (#2). A fraction of the settled solids containing fine particles and organic matter will be filtered through geotextile tubes, with the ellutriant captured and recirculated to the settling tank. Water from Tank #2 will be returned to the dredge pump head as make up water for dredging activities. Excess water will drain by gravity via an overflow pipe into the equalization tank (#3) for additional filtering through geotextile filters. The effluent will be sampled and discharged to either the local sanitary sewer system for additional treatment, or through granular activated carbon (GAC) prior to discharge into the River.

3.2.1 Site Preparations for Secondary Containment

The primary dewatering site is located in the parking area located west and north-west of the former tire building as shown on **Figure 3**. The site of dewatering operations shall be conducted on a concrete surface with provisions to provide containment around the treatment and storage system. Geotextile tubes shall be staged in pairs with access from either side for filling from the header pipe manifold. Dried sediments will be managed in accordance with Section 3.3.

3.2.2 Drainage and Carriage Water Conveyance

Effluent from the dewatering and treatment process shall flow from tank #3 by gravity drainage into the diversion chamber leading to the box culvert discharging at the Adjacent Outfall.

3.2.3 Discharge Monitoring

The WDNR permit includes provisions for monitoring effluent from the dewatering operations. An inline flow totalizer will be placed in the discharge line and read daily. The effluent monitoring will be conducted daily during the first two days, plus one

additional sample during the first week. Grab samples will be collected from Tank #3 for field turbidity, total suspended solids, and the primary contaminants of concern; including, polychlorinated biphenyls (PCBs), inorganics/metals (arsenic, lead, methyl mercury, and zinc), and polycyclic aromatic hydrocarbons (PAHs), along with the recording of the flow volume. Samples for laboratory analyses will be requested on a "rush" turn-around basis; typically, within 24-72 hours of sample receipt at the laboratory. The sampling frequency will be reduced to one per week thereafter on a normal lab turn-around time, once compliance with discharge limits established in the permit by DNR is demonstrated.

3.2.4 Contingency for Wastewater Treatment

This plan includes a contingency for discharge of effluent to the City of Janesville Waste Water Treatment Plant (WWTP). A sanitary manhole is located on the east side of the former tire building. The City's WWTP has the capacity to accept up to 1 MGD and sewer lines are suitable for such conveyance. The project has been discussed with the City WWTP plant operators and they are amenable to receipt, if needed.

3.3 Sediment Management

Recovered sediments shall be allowed to dry until no free liquids are present. Once dewatered, dried sediments will be characterized for proper re-use onsite or final disposal offsite, in accordance with the Sampling and Analyses Plan (SAP)/Quality assurance Project Plan (QAPP). Previous analytical results from sediment and porewater samples indicate the dried sediments may provide beneficial re-use as fill materials during redevelopment of the Site.

The sediment will be dewatered and samples of the dried sediment will be obtained for laboratory analysis per the Sampling and Analysis Plan. The intital stockpile will be sampled at a frequency of one sample from the first 100 cubic yards (CY), one sample will be collected ffrom the first 300 CY, and one sample will be collected from the first 500 CY. The analytical results will be compared to the industrial RCLs. Samples will be collected from every 500 CY stockpile thereafter, assuming the initial three-sample data asset. Sampling of each stockpile (approximately 500 cubic yards per pile) will be completed to document the soil quality for reuse on site or final disposal offsite. Sampling of the dry sediment will consist of both total elemental analyses and a water-leaching extract. A representative sample from each 500-yard stockpile will be obtained by obtaining a composite sample from 5 discrete locations within each stockpile. The amount of sediment anticipated to be removed (15,000 cubic yards), approximately 32 composite samples will be collected and analyzed.

A stockpile will be created south of the diversion chamber and best management practices (i.e., silt fence) will be utilized for storm water runoff protection in accordance with local and State law.

Each stockpile and geotextile tube will be monitored for drying by periodically collecting samples to test for free liquids by the paint filter liquids test (PFLT)and moisture content. Once passing a PFLT, dried sediments will be moved to the stockpile. Any seepage will be collected and recirculated through the

treatment sytem. Based upon the existing data, it is assumed that dried sediments will meet criteria for beneficial re-use as fill materials onsite, assuming appropriate consent of the WDNR is granted.

This plan includes a contingency for disposal, likely as daily cover, to the Waste Management Landfill(s) located in Sun Prairie (Madison Prairie Landfill) or Watertown (Deer Track Park Landfill), Wisconsin. Solids may require additional treatment by lime or cement and testing to meet landfill acceptance criteria for compressive strength and shear strength.

3.4 Site Restoration

Documentation will be provided that the post-dredge measurements of the site specific to the project goals of sediment removal. These document may include, but are not limited to, bathymetric measurements, grab sample and poling logs, chemistry results and other data to document the post-dredge conditions of the site. The WNDR will review the post-dredging documents and provided written approval that the remedial action goals have been met, the area of sediment removal will then be covered with a layer of granular material in-stream to provide habitat and meet erosional protection specifications for bank stabilization. A 12-inch layer of habitat-suitable media (i.e., sand) will be placed as bedding in the Rock River upon completion of dredging activities. The fill certification procedures and specifications include chemical analyses. Townline 7/8” reject is screened dense-graded sand/gravel that is naturally clean and free of contaminants with a consistent gradation of 100% passing the 1” sieve, approx 30% passing the #40 sieve and approx 3% passing the #200 sieve. This material has been certified by WisDOT as approved backfill underneath interstate bridges. An independent laboratory must complete testing of the material for WisDOT certification. This material is suitable to be placed on the bottom of the Rock River from a floating platform. A stockpile (approximately 6,500 tons) will be segregated and sampled in advance of delivery to the project site.

4.0 WDNR Closure Deliverables

The sediment removal project activities will be documented in daily logs, photos, monitoring data, and sediment management records. Documentation shall be compiled into a final report for submittal to the WDNR.

4.1 Closure Request Form with Documentation

Jaines, LLC shall request a closure letter from the WDNR upon project completion to close out the applicable BRRTS number. The associated report will summarize the previous reports, site information and history, site conditions, investigation data, document remedial actions, and achievement of remedial goals. The report will also provide maps and figures, and other relevant closure documentation.

The Remedial Action is designed to mitigate COPECs posing a potential ecological risk to benthic invertebrates inhabiting sediments in the vicinity of the Adjacent Outfall. The Plan proposes removal of impacted sediments and includes provisions for documenting that Remedial Goals have been achieved so that no continuing obligations are required.

Future site conditions after dam demolition are outside the scope of this project and can be addressed separately once a new Ordinary High Water Mark is established by DNR.

4.2 GIS Registry

The final Site conditions and any associated restrictions shall be documented on appropriate forms (4400-202) and memorialized via the WDNR GIS Registry.

5.0 REFERENCES

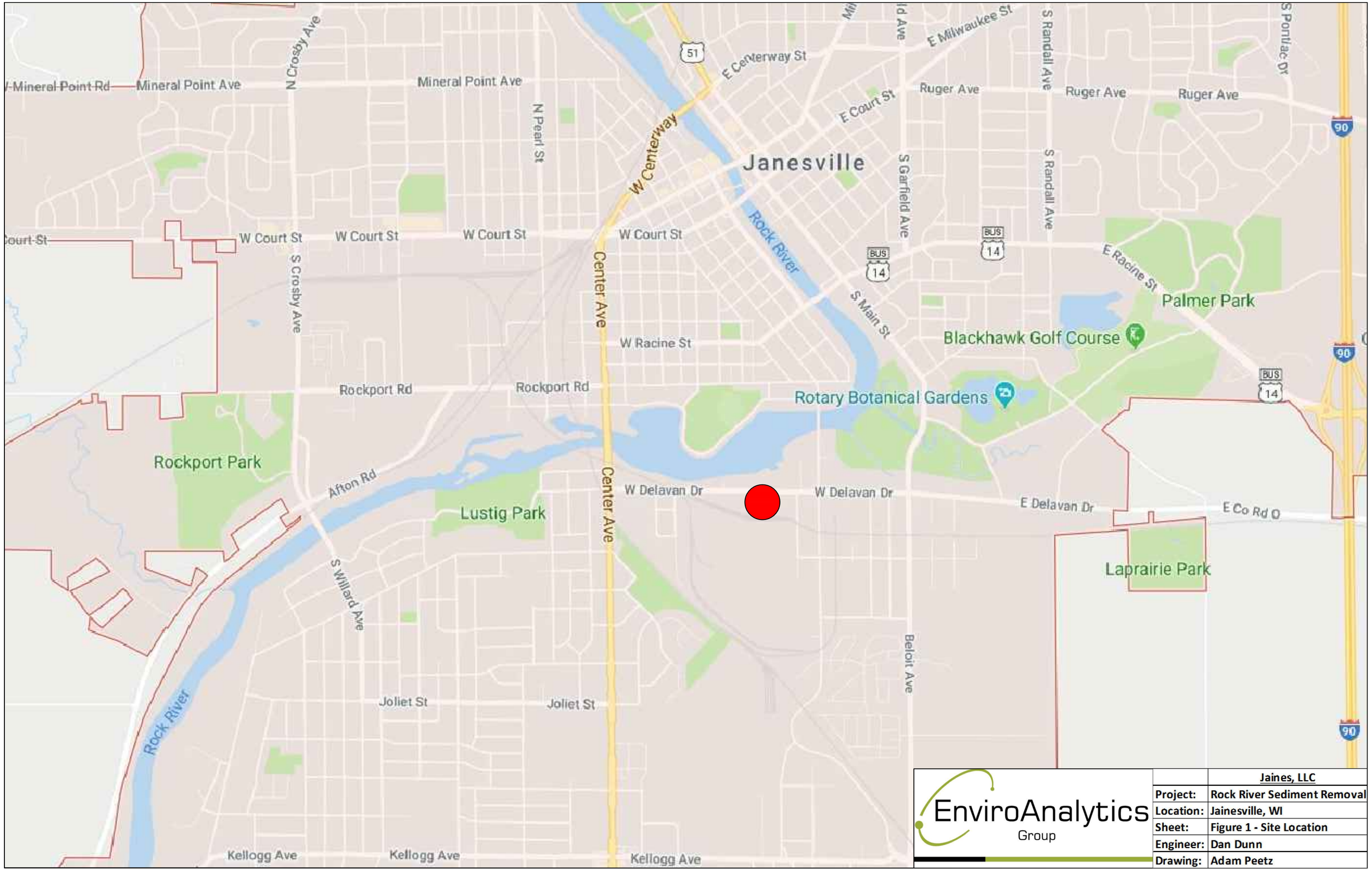
1 GHD, 2017. Remedial Action Options Report (RAOR), Rock River outflow of storm sewer pipe located north of the former GM LLC Assembly Plant, BRRTS # 02-54-577951.

2 GHD, 2017. Rock River (RM 178.5 to 180.5) Site Investigation Report, GM Janesville Assembly Plant, 1000 General Motors Drive, Janesville. May 31, 2017.

3 GHD, 2016. Phase II Environmental Site Assessment (ESA) Work Plan, GM Janesville Assembly Plant, 1000 General Motors Drive, Janesville, Wisconsin. Memorandum to Kim Tucker-Billingslea, GM. January 4.

4 Inter-Fluve, Inc., 2015. Monterey Dam Impoundment Sediment Report. December 22, 2015.

FIGURES



EnviroAnalytics Group

	Jaines, LLC
Project:	Rock River Sediment Removal
Location:	Jainesville, WI
Sheet:	Figure 1 - Site Location
Engineer:	Dan Dunn
Drawing:	Adam Peetz

EnviroAnalytics Group

	Jaines, LLC
Project:	Rock River Sediment Removal
Location:	Jainesville, WI
Sheet:	Figure 2 - Site Aerial
Engineer:	Dan Dunn
Drawing:	Adam Peetz

Monitoring Station (Upstream)
Silt Curtian
GPS Nodes
Remedial Action Area
Dredging Pump
Floating Hose
Adjacent Outfall
GAC Treatment
Filter
Monitoring Station (Downstream)
Concentrator
Lined Berm
Access Route
Geotextile Tubes
Liner
Temporary HDPE Piping
Waste Piles (for off-site disposal)
Diversion Chamber
Decon Area
Discharge to Sanitary Sewer
Gate
Drying Bed
Scale
Sump and Waste Water Sewer
Job Site Trailer
Silt Fence
Clean Stock Pile (for beneficial re-use)
Sand stockpile dividers
1"=100'
Tank 1 - Settling Tank
Tank 2 - Return Water Tank
Tank 3 - Equallzation Tank
Ice Age National Sc
Industrial Ct
S Jackson S

WISCONSIN
DANIEL M DUNN
E-30834-006
ST. LOUIS, MO
PROFESSIONAL ENGINEER

EnviroAnalytics Group

	Jaines, LLC
Project:	Rock River Sediment Removal
Location:	Jainesville, WI
Sheet:	Figure 3 - Project Layout
Engineer:	Dan Dunn
Drawing:	Adam Peetz

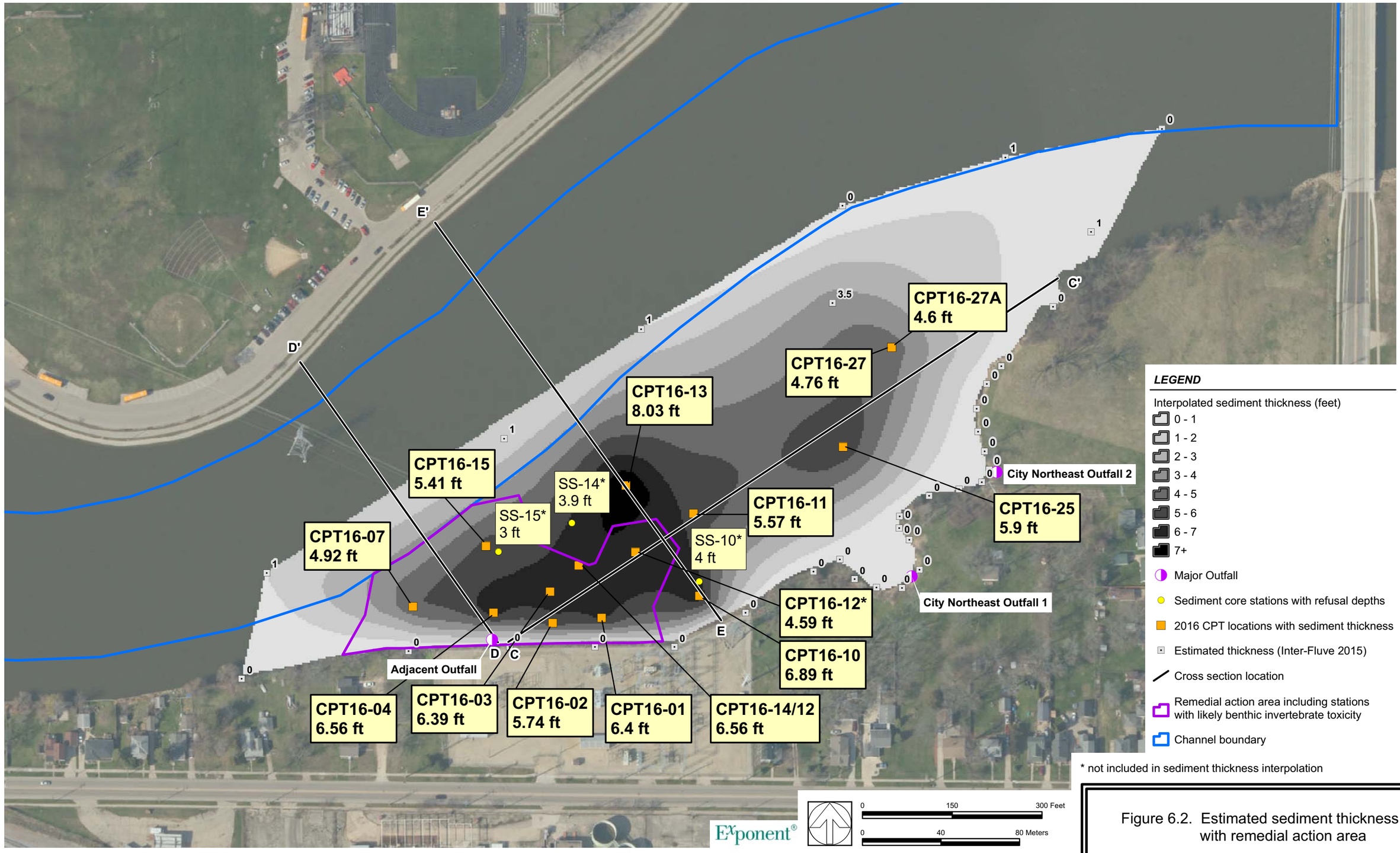


Figure 6.2. Estimated sediment thickness with remedial action area

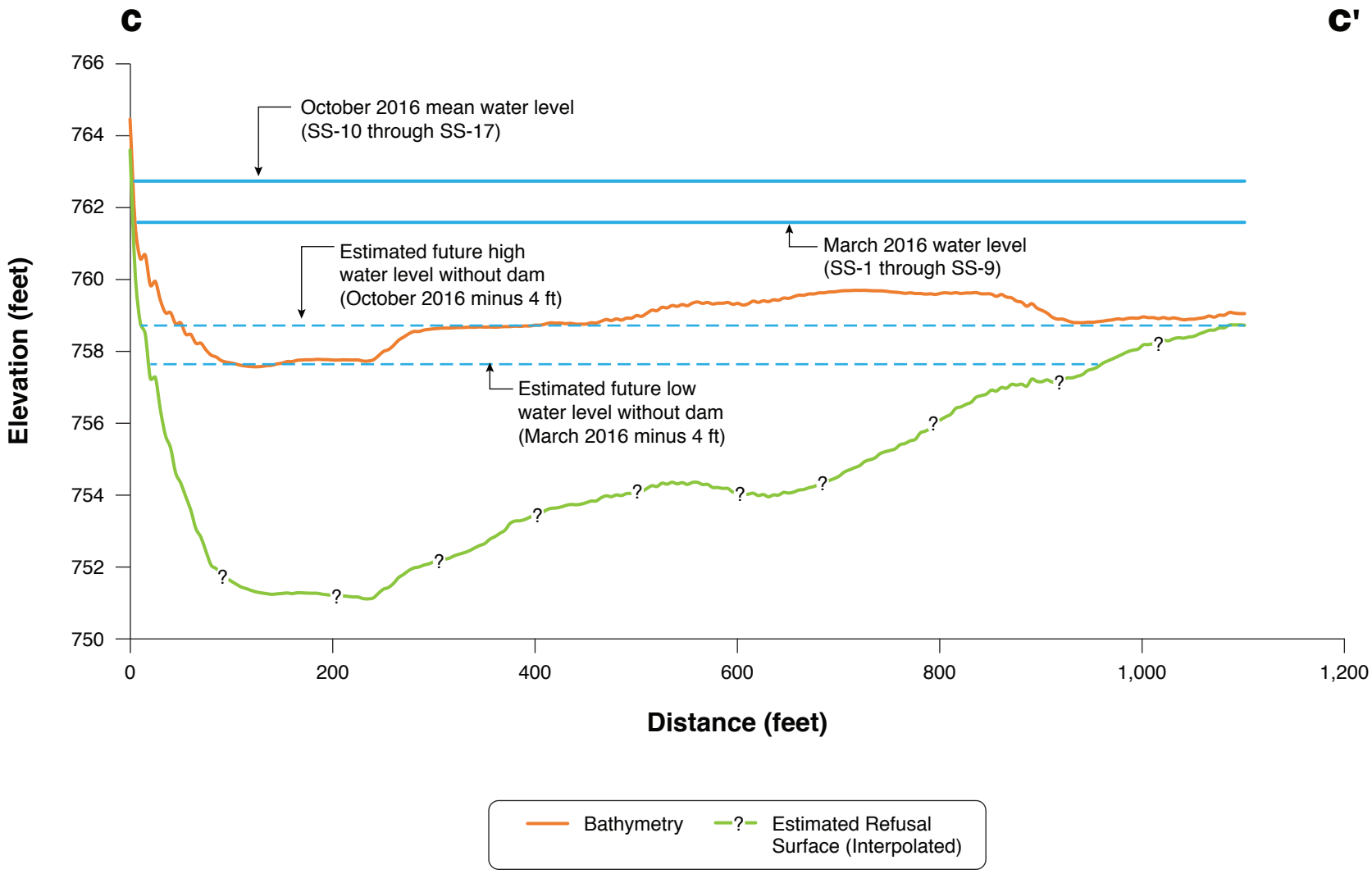


Figure 6.3. South Shore Section C–C'

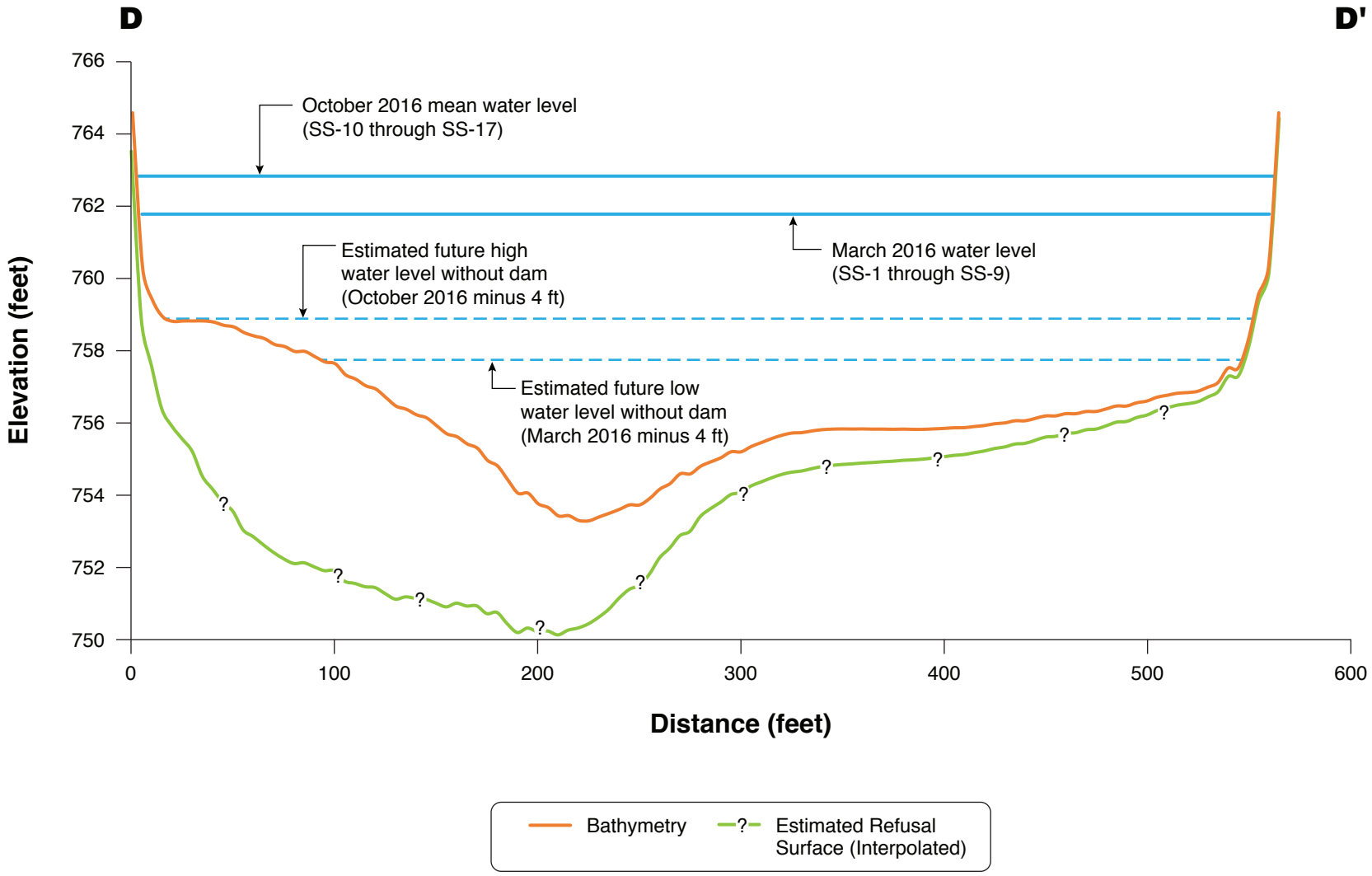


Figure 6.4. South Shore Section D–D'

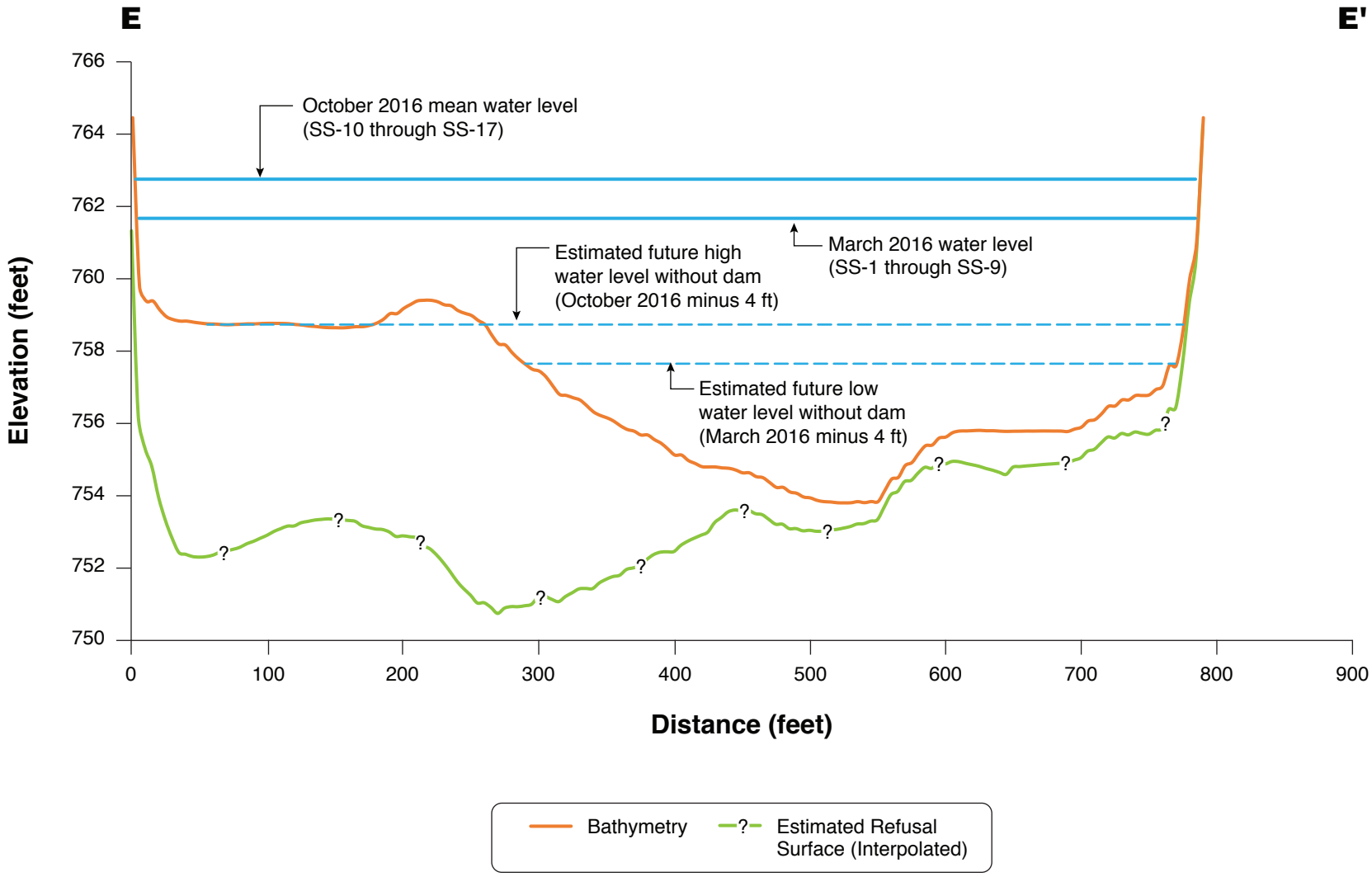
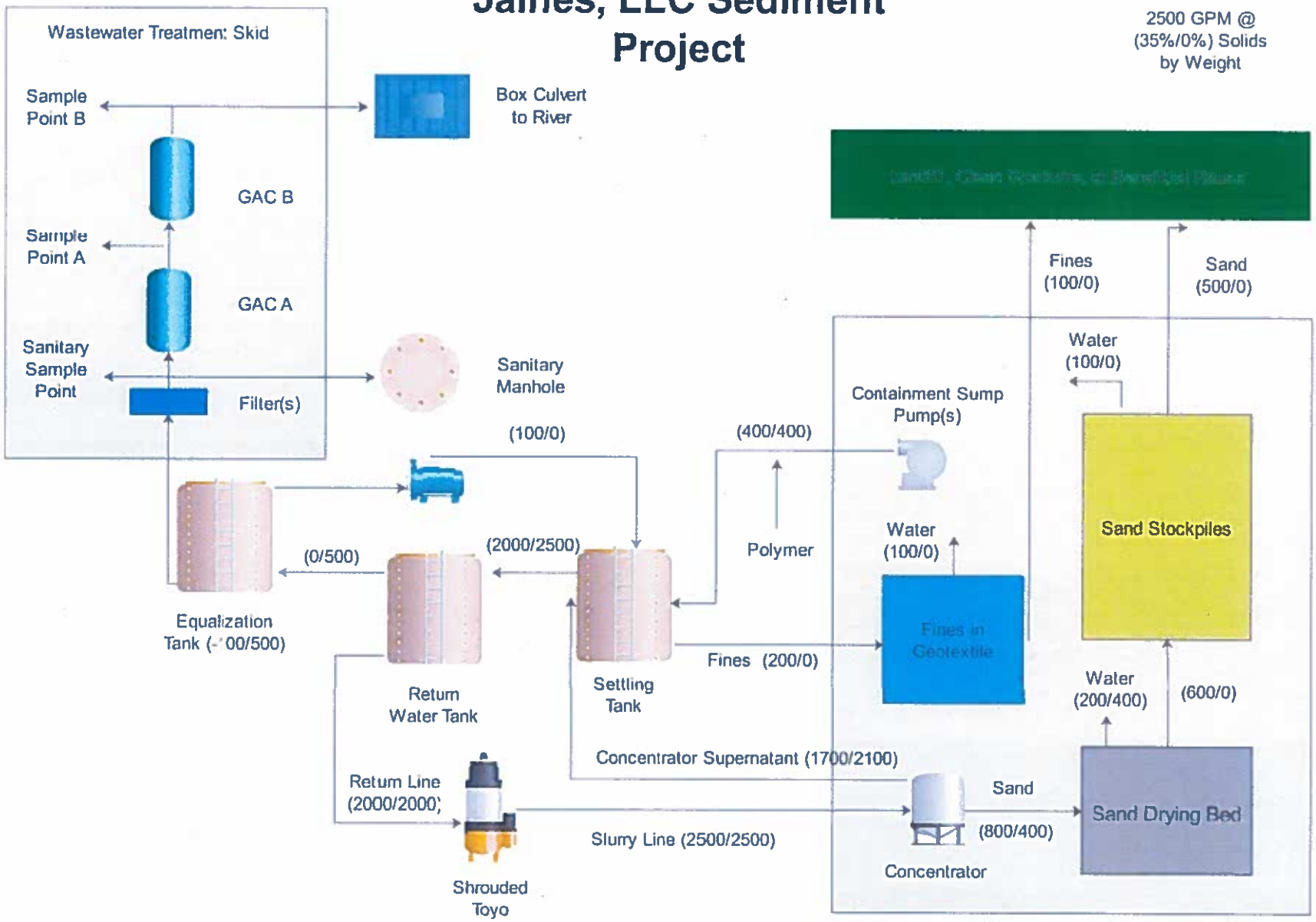


Figure 6.5. South Shore Section E–E'

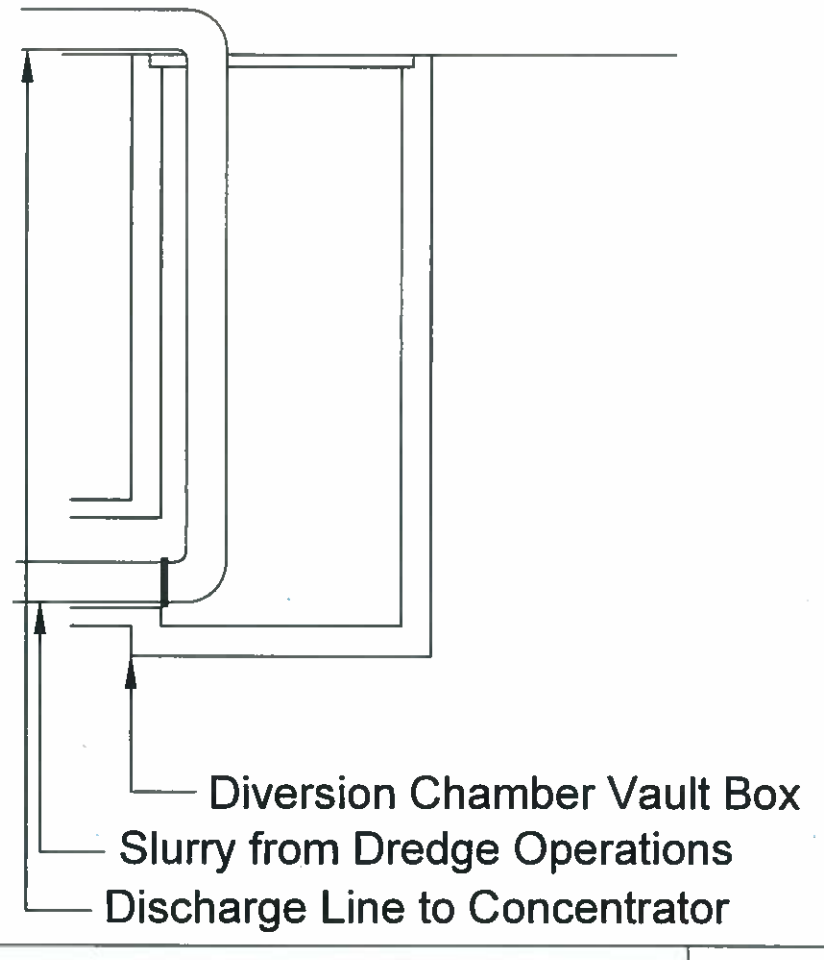
P&ID for Jaines, LLC Sediment Project

May 21, 2018

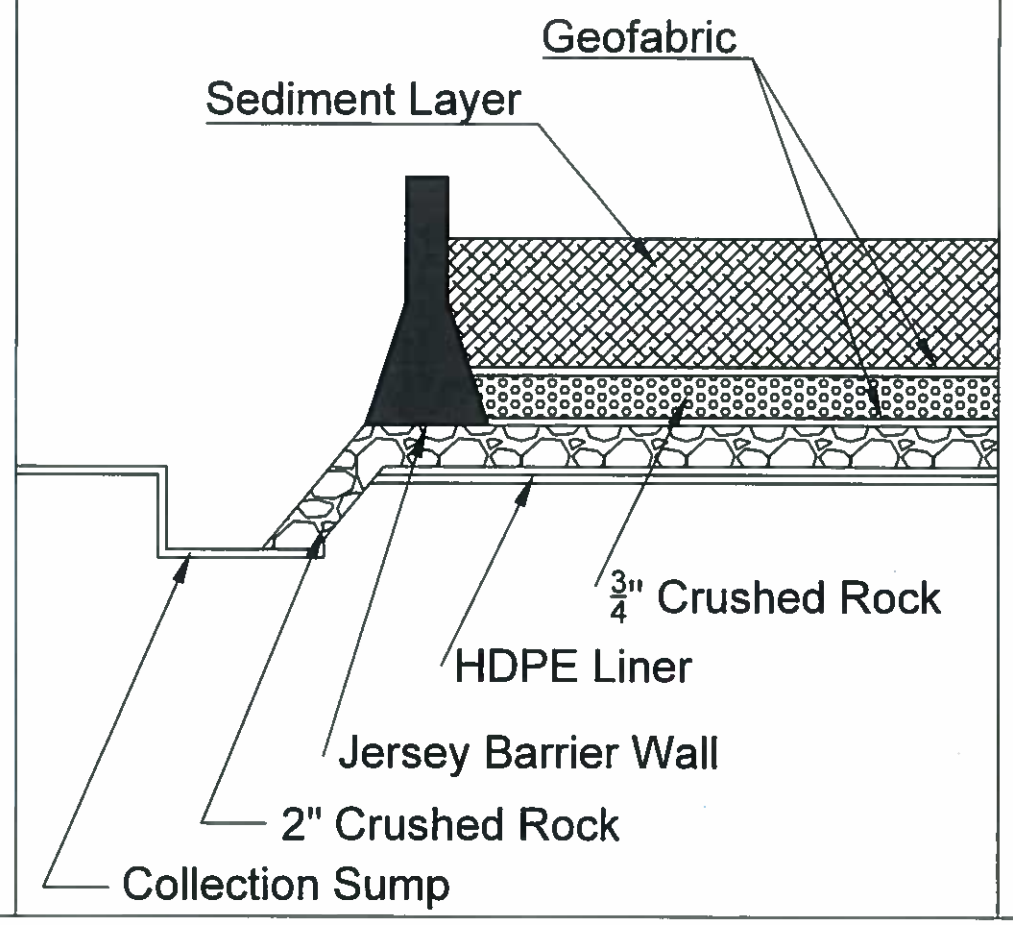
2500 GPM @ (35%/0%) Solids by Weight



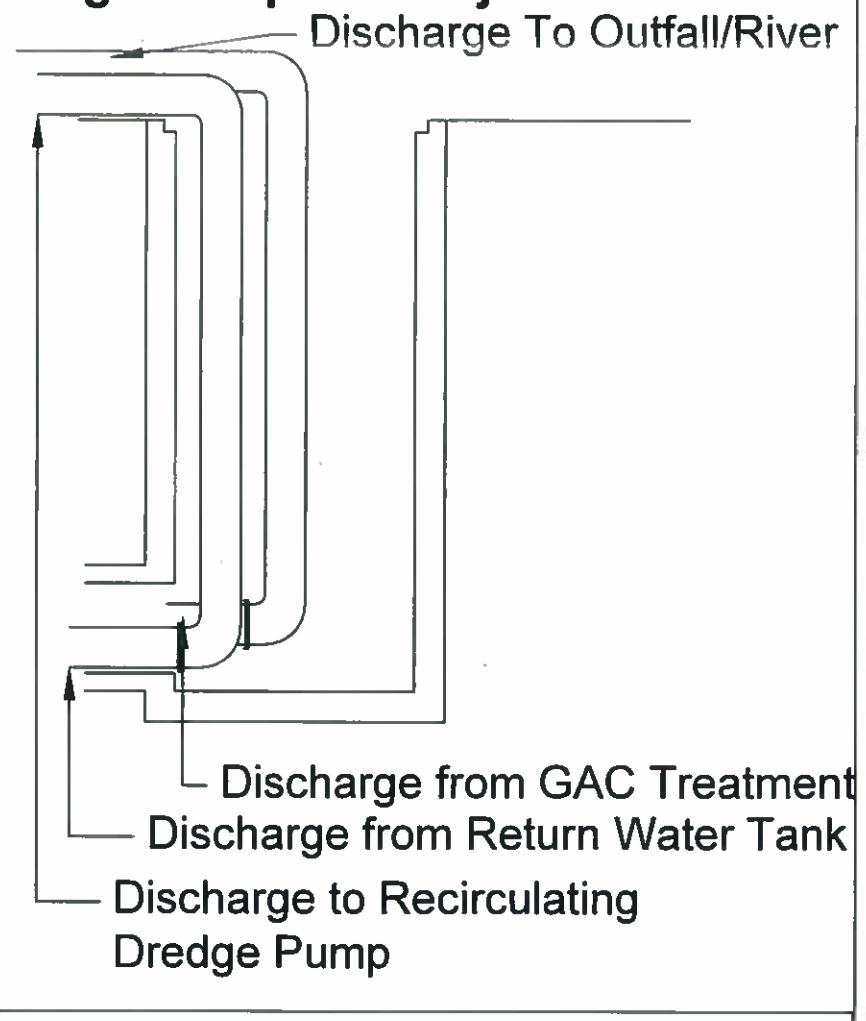
Sediment Discharge to Geotube Header



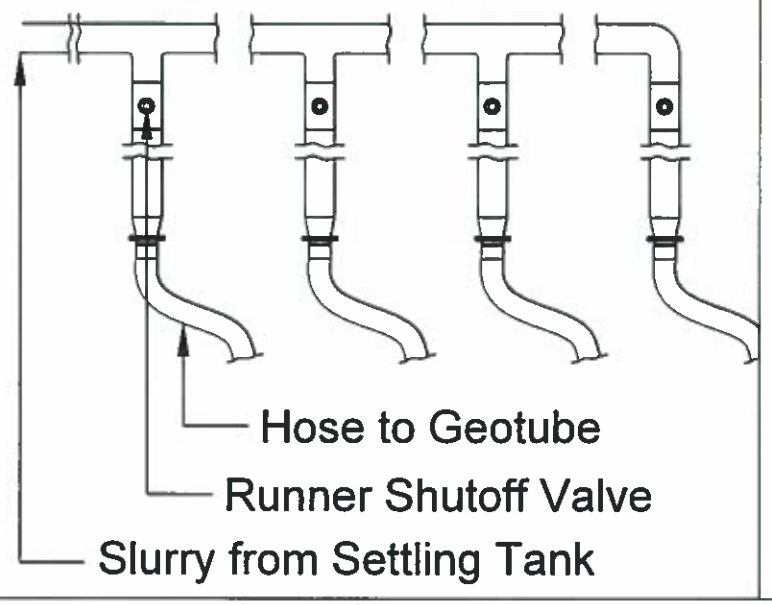
Sediment Drying Bed Detail



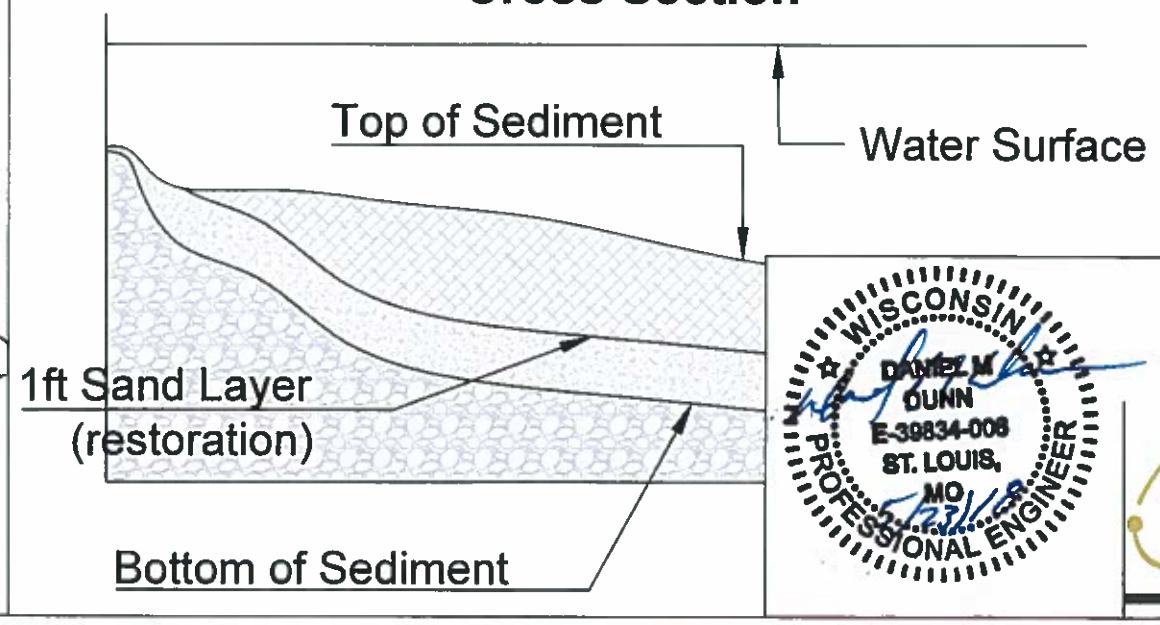
Diversion Chamber Discharge to Dredge Pump and Adjacent Outfall



HDPE Distribution Header



Restored River Bottom Cross Section



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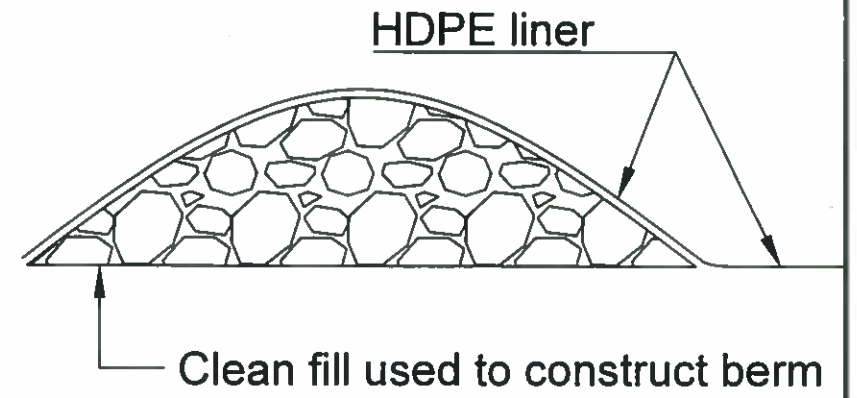
Berm Cross-section



EnviroAnalytics Group

	Jaines, LLC
Project:	Rock River Sediment Removal
Location:	Jainesville, WI
Sheet:	Figure 6 - System Details
Engineer:	Dan Dunn
Drawing:	Adam Peetz

ATTACHMENTS

A	March 1, 2018 Meeting Minutes
B	Treatability studies
B-1	Hanging bag test report
B-2	Polymer screening bench-scale study
C	Sampling and Analses Plan (SAP) with QAPP
D	Draft Carriage Water Discharge Permit
E	Copy of revised Engineering Design Report (for GP WI-0046558-05-0)
F	DNR Guidelines, equipment and materials specifications
G	**Tables and Figures (from GHD RRIR, 2017, *included for convenience*)**
Fig. 5.11	*Spatial Distribution of Metal-PAH Mixtures and Toxicity Predictions*
Fig 6.1	*Sediment area for potential remedial action*

ATTACHMENT A March 1, 2018 Meeting Minutes

Jaines, LLC Rock River Sediment Removal RAP, DNR Janesville Office
Meeting Minutes
March 1, 2018

Attendees: Dan Dunn, EnviroAnalytics Group
Tim Whitaker, City of Janesville, by phone
Steve Ales, Bill Fitzpatrick, Susan Eichelkraut (by phone), Jeff Schure, Dan Bekta: WDNR

Dan D- Background summary. Previous contractors prepared the SI and RAOR. Reports were accepted by WDNR. Two-acre sediment deposit near adjacent outfall. COCs: PAHs, lead, mercury, PCBs. Goal is unencumbered closure without continuing obligations.

Dan D is working on RAP, elements of the plan:

- Hydraulic dredging of all sediment identified in the SI, down to gravel
- Silt curtains and turbidity monitoring
- Dredge measurements and performance standards including pre- and post-bathymetry and confirmation sounding and sampling.
- Pipeline via storm sewer to processing area north of former tire building.
- Dewatering via geotextile tubes in parking lot
- Return of carriage water via city storm water outfall (id'd in the meeting handouts as City Northeast Outfall 1)
- Contingency plan for waste water including secondary filtering, storage, monitoring.
- Dewatered sediment sampling and beneficial reuse as fill.

Dan B- industrial storm water permit will be necessary

Susan E- waste water will require startup sampling prior to discharge to the river, initial parameter list will be all parameters in sediment > TEC. Input from regional biologist and others may expand the parameter list. TSS limits will be imposed.

Water treatment additives must be approved prior to use. Suggest listing all potential additives in permit application for staff review, saving time during implementation if contingency use is needed.

Dan D- he has tanks on the site that can be used to store waste water.

Dan D- boat access: the primary plan is for access at the ramp on north shore above the 2 bridges upstream of the site. The timber foot bridge may have clearance issues. A backup plan is for crane launch from shoreline of park east of the site on the south shore.

Tim W- City may allow crane launching from Riverside Street at Monterey Park. That location has advantages.

Jeff S- reminder that any structure placed in the water will need a permit, e.g., boat ramp.

Dan D- no structure is proposed for launching.

Dan D- RAP will propose to dig to gravel, remove all targeted sediment, he had no plan to sample the river bed post dredging. The RAP will coordinate restoration with city's plan for the area. Dan estimated the volume to be removed at 15-20,000 cu yds.

Tim W- The city plan for the area is to establish vegetation and stabilization of the outfall culvert channel. City wants a planting medium for vegetation. The city has an anticipated OHWM post dam removal from InterFluve that can be used to predict what part of the area will be above water post dam removal.

Bill F- The DNR will want post-removal verification sampling. The RAP should explain the reason behind a proposed removal boundary. The purple line boundary shown on the meeting handout page 6, Figure 3 – Project Layout seems to exclude past sample areas with elevated COCs.

Dan D- The RAP will make the case for the removal areas. Figure 3 – Project Layout mistakenly excluded areas the RAP intended to be in the removal boundary. This will be corrected in the RAP. He doesn't intend to sample post removal because there will be nothing to sample.

Bill F- If there is no sediment remaining the RAP should have a plan to document and demonstrate this. The lack of sediment can be demonstrated with soundings and a grab sampler. If it can be shown that all sediment has been removed then sediment chemistry is not necessary. If it is possible to sample, the DNR will want chemistry to document the removal work. A residual management plan is encouraged. Residuals remaining following hydraulic dredging is common. Residuals can be addressed with a sediment cover to attain project goals.

Steve A- The site post-dredging will have a mixture of areas above and below the water. The OHWM defines the boundary between sediment and soil. We need the project to achieve the most protective endpoint between sediment and soil for future conditions with or without the dam.

Jeff S- what is the contingency if the dam is down and the water level is down?

Dan D- He will need to rebid the construction.

Jeff S- the project will need a waterway IP which will require public notice and may require a public meeting. The timeline is tight.

Dan D- He will try for 2 weeks to submit the permit application.

April 30 was suggested for a public meeting/ information session, with a April 23 public notice

Susan E- a public meeting is not needed for the WPDES permit. She will need 30 days for a plan review.

Steve A- NR 714 public participation needs can be addressed at the public meeting/ information session.

Tim W- the city's schedule is to award the bid for dam removal on March 12, July 16 start the drawdown.

Jeff S- he will start archeological review and coordinate with Mark D. The existing NHI from GM may cover the dredging project. He doesn't expect Corps review delay; Rachel from the Waukesha office may be the reviewer.

Susan E- she is emailing the WPDES forms to Dan D.

Dan D- dewatered sediment will be characterized in the geotextile tubes for decisions on disposition of the sediment after drying. He expects 7000 tons of sediment after drying. Each tube will hold 250 cu yds. He expects 30-32 tubes total. He intends to beneficially reuse the dewatered sediment.

Steve A- NR 700 has sampling specifications by volume. (The reference is NR 718.12)

Bill F- The RAP should call out testing and the decision process for the reuse of the dewatered sediment.

Jeff S- The dredging permit application must include a stabilization plan for the storm water outfall post dredging.

The meeting handouts from Dan Dunn provide additional details including project schedules for submittals, permits, and construction.

Minutes prepared by Bill Fitzpatrick

ATTACHMENT B Treatability studies
B-1 Hanging bag test report
B-2 Polymer screening bench-scale study

Memorandum

DATE: March 23, 2018
FROM: Riley underwood
TO: Dan Dunn
RE: Rock River sediment hanging bag test

Introduction

On March 14th 2018, EAG collected sediment samples from the Remedial Action Area near the Adjacent Outfall of the Former GM Plant in Janesville, WI. The RAA will dredged to remove approximately 16,000 cubic yards of impacted sediment covering approximately 2 acres within the Rock River.

The river bottom of the outfall was sampled and evaluated in anticipation of the project that is to take place in mid-2018. The dredging project will rely on pumping the sedimentary slurry into interwoven geotextile dewatering tubes.

A qualitative evaluation of these filter media was conducted as a "hanging bag test" to measure their effectiveness of solids retention. Additionally, the effluent through the filter was sampled and evaluated for the presence of potential contaminants of concern previously identified in River sediments.

Objectives

The purpose of the "Hanging Bag Performance Evaluation" was to measure the concentration of suspended solids through a filter media assess measure whether any constituents previously identified in the sediment were present in effluent water.

Procedure

1. Sampling team took a small boat out on the Rock River at the mouth Adjacent Outfall, known as the Remedial Action Area with sampling equipment.

2. Sediment was collected from six locations around RAA near the Outfall using a PONAR grab sampler that consists of two opposing semi-circular jaws that are normally held open by a trigger mechanism (Figure 1). The sampler was lowered to the bottom where a trigger and a strong spring snap the jaws shut trapping a sample of the bottom inside. A screen covers the top of the jaws so that the trapped material did not wash out as the sampler was retrieved.

3. Sediment samples were collected in a distributed manner from the Risk Management Area, each collected in a lined 5-gallon cans with a sediment/water ratio of approximately 3:1. Figure 2 shows the approximate locations of sediment collection.

4. Six buckets were delivered to Infrastructure Alternatives for a polymner screening and separate hanging bag test with effluent sampling and analyses.

5. The hanging bag was pre-cut to form a container that was approximately 45-in inside circumference and 36-in long in length.

6. The bag was suspended from a metal bar by its handles off scaffolding as shown in Figure 3. The bottom of the container was suspended approximately 36-in off the ground.

7. Sediment was mixed with the water in each bucket to form a slurry, and then slowly added to the hanging bag. Filtered water was collected in a container set beneath the bag. Two discrete samples were taken directly from the dripping effluent along with one composite sample from the collection container for analyses of: TSS, PAHs, PCBs, RCRA metals plus Zn. The field team waiting for an additional cooler with containers arriving the following day, to collect an additional discrete and composite sample analyses of Methyl Mercury.

   Photos and the laboratory report associated with the untreated but filtered sediment slurry "carriage water" are attached.

   The IAI polymer report and subsequent laboratory report are still in process and will be forwarded to DNR upon receipt by EAG.

PONAR grab sampling device

EnviroAnalytics
Group

EnviroAnalytics Group

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

March 22, 2018

Dan Dunn
EnviroAnalytics
1650 Des Peres Road
Suite 230
Saint Louis, MO 63131

RE: Project: JANESVILLE
Pace Project No.: 40165960

Dear Dan Dunn:
Enclosed are the analytical results for sample(s) received by the laboratory between March 15, 2018 and March 19, 2018. 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.

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

Sincerely,

Laurie Woelfel

Laurie Woelfel
laurie.woelfel@pacelabs.com
(920)469-2436
Project Manager

Enclosures

Pace Analytical Services, LLC
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CERTIFICATIONS

Project: JANESVILLE
Pace Project No.: 40165960

Duluth Minnesota Cerification ID's
4730 Oneota St., Duluth, MN 55807
Minnesota Dept of Health Certification #: 1382680
Nevada DCNR Certification #: MN000372018-1
Montana DHHS Certification #: CERT0102
Wisconsin DNR Certification # : 999446800
North Dakota Certification #: R-105

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky UST Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 12064
North Dakota Certification #: R-150
Virginia VELAP ID: 460263
South Carolina Certification #: 83006001
Texas Certification #: T104704529-14-1
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
USDA Soil Permit #: P330-16-00157
Federal Fish & Wildlife Permit #: LE51774A-0

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SAMPLE SUMMARY

Project: JANESVILLE
Pace Project No.: 40165960

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40165960001	**DISCRETE #1**	Water	03/14/18 15:00	03/15/18 09:50
40165960002	**DISCRETE #2**	Water	03/14/18 16:00	03/15/18 09:50
40165960003	**COMPOSITE**	Water	03/14/18 17:00	03/15/18 09:50
40165960004	**DISCRETE**	Water	03/15/18 11:00	03/19/18 14:00
40165960005	**COMPOSITE**	Water	03/15/18 12:30	03/19/18 14:00
40165960006	**FIELD BLANK**	Water	03/15/18 13:00	03/19/18 14:00

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SAMPLE ANALYTE COUNT

Project: JANESVILLE
Pace Project No.: 40165960

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40165960001	**DISCRETE #1**	EPA 8082	BDS	10	PASI-G
		EPA 6010	JLD	8	PASI-G
		EPA 7470	AJT	1	PASI-G
		EPA 8270 by HVI	TPO	21	PASI-G
		SM 2540D	JMN	1	PASI-G
40165960002	**DISCRETE #2**	EPA 8082	BDS	10	PASI-G
		EPA 6010	JLD	8	PASI-G
		EPA 7470	AJT	1	PASI-G
		EPA 8270 by HVI	TPO	21	PASI-G
		SM 2540D	JMN	1	PASI-G
40165960003	**COMPOSITE**	EPA 8082	BDS	10	PASI-G
		EPA 6010	JLD	8	PASI-G
		EPA 7470	AJT	1	PASI-G
		EPA 8270 by HVI	TPO	21	PASI-G
		SM 2540D	JMN	1	PASI-G
40165960004	**DISCRETE**	EPA 1630 (1998)	CPK	1	PASI-DUL
40165960005	**COMPOSITE**	EPA 1630 (1998)	CPK	1	PASI-DUL
40165960006	**FIELD BLANK**	EPA 1630 (1998)	CPK	1	PASI-DUL

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ANALYTICAL RESULTS

Project: JANESVILLE
Pace Project No.: 40165960

Sample: DISCRETE #1 **Lab ID: 40165960001** Collected: 03/14/18 15:00 Received: 03/15/18 09:50 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8082 GCS PCB	Analytical Method: EPA 8082 Preparation Method: EPA 3510								
PCB-1016 (Aroclor 1016)	**<0.26**	ug/L	0.51	0.26	1	03/19/18 09:30	03/21/18 04:37	12674-11-2	
PCB-1221 (Aroclor 1221)	**<0.26**	ug/L	0.51	0.26	1	03/19/18 09:30	03/21/18 04:37	11104-28-2	
PCB-1232 (Aroclor 1232)	**<0.26**	ug/L	0.51	0.26	1	03/19/18 09:30	03/21/18 04:37	11141-16-5	
PCB-1242 (Aroclor 1242)	**<0.26**	ug/L	0.51	0.26	1	03/19/18 09:30	03/21/18 04:37	53469-21-9	
PCB-1248 (Aroclor 1248)	**<0.26**	ug/L	0.51	0.26	1	03/19/18 09:30	03/21/18 04:37	12672-29-6	
PCB-1254 (Aroclor 1254)	**<0.26**	ug/L	0.51	0.26	1	03/19/18 09:30	03/21/18 04:37	11097-69-1	
PCB-1260 (Aroclor 1260)	**<0.26**	ug/L	0.51	0.26	1	03/19/18 09:30	03/21/18 04:37	11096-82-5	
PCB, Total	**<0.26**	ug/L	0.51	0.26	1	03/19/18 09:30	03/21/18 04:37	1336-36-3	
Surrogates									
Tetrachloro-m-xylene (S)	56	%	44-121		1	03/19/18 09:30	03/21/18 04:37	877-09-8	
Decachlorobiphenyl (S)	46	%	10-119		1	03/19/18 09:30	03/21/18 04:37	2051-24-3	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Arsenic	**17.4J**	ug/L	25.0	8.3	1	03/19/18 07:29	03/19/18 16:21	7440-38-2	
Barium	**475**	ug/L	5.0	1.5	1	03/19/18 07:29	03/19/18 16:21	7440-39-3	
Cadmium	**1.9J**	ug/L	5.0	1.3	1	03/19/18 07:29	03/19/18 16:21	7440-43-9	
Chromium	**63.6**	ug/L	10.0	2.5	1	03/19/18 07:29	03/19/18 16:21	7440-47-3	
Lead	**258**	ug/L	13.0	4.3	1	03/19/18 07:29	03/19/18 16:21	7439-92-1	
Selenium	**<16.6**	ug/L	50.0	16.6	1	03/19/18 07:29	03/19/18 16:21	7782-49-2	
Silver	**<3.3**	ug/L	10.0	3.3	1	03/19/18 07:29	03/19/18 16:21	7440-22-4	
Zinc	**490**	ug/L	40.0	9.3	1	03/19/18 07:29	03/19/18 16:21	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**1.6**	ug/L	0.42	0.13	1	03/19/18 11:10	03/20/18 12:12	7439-97-6	
8270 MSSV PAH by HVI	Analytical Method: EPA 8270 by HVI Preparation Method: EPA 3510								
Acenaphthene	**0.018J**	ug/L	0.030	0.0061	1	03/16/18 10:39	03/19/18 16:16	83-32-9	
Acenaphthylene	**0.023J**	ug/L	0.025	0.0050	1	03/16/18 10:39	03/19/18 16:16	208-96-8	
Anthracene	**0.034J**	ug/L	0.052	0.010	1	03/16/18 10:39	03/19/18 16:16	120-12-7	
Benzo(a)anthracene	**0.13**	ug/L	0.038	0.0076	1	03/16/18 10:39	03/19/18 16:16	56-55-3	
Benzo(a)pyrene	**0.17**	ug/L	0.053	0.011	1	03/16/18 10:39	03/19/18 16:16	50-32-8	
Benzo(b)fluoranthene	**0.29**	ug/L	0.029	0.0057	1	03/16/18 10:39	03/19/18 16:16	205-99-2	
Benzo(g,h,i)perylene	**0.21**	ug/L	0.034	0.0068	1	03/16/18 10:39	03/19/18 16:16	191-24-2	
Benzo(k)fluoranthene	**0.17**	ug/L	0.038	0.0076	1	03/16/18 10:39	03/19/18 16:16	207-08-9	
Chrysene	**0.27**	ug/L	0.065	0.013	1	03/16/18 10:39	03/19/18 16:16	218-01-9	
Dibenz(a,h)anthracene	**0.021J**	ug/L	0.050	0.010	1	03/16/18 10:39	03/19/18 16:16	53-70-3	
Fluoranthene	**0.58**	ug/L	0.053	0.011	1	03/16/18 10:39	03/19/18 16:16	206-44-0	
Fluorene	**0.018J**	ug/L	0.040	0.0080	1	03/16/18 10:39	03/19/18 16:16	86-73-7	
Indeno(1,2,3-cd)pyrene	**0.15**	ug/L	0.088	0.018	1	03/16/18 10:39	03/19/18 16:16	193-39-5	
1-Methylnaphthalene	**0.012J**	ug/L	0.030	0.0059	1	03/16/18 10:39	03/19/18 16:16	90-12-0	
2-Methylnaphthalene	**0.014J**	ug/L	0.024	0.0049	1	03/16/18 10:39	03/19/18 16:16	91-57-6	
Naphthalene	**0.047J**	ug/L	0.092	0.018	1	03/16/18 10:39	03/19/18 16:16	91-20-3	
Phenanthrene	**0.30**	ug/L	0.069	0.014	1	03/16/18 10:39	03/19/18 16:16	85-01-8	
Pyrene	**0.46**	ug/L	0.038	0.0076	1	03/16/18 10:39	03/19/18 16:16	129-00-0	
Total PAHs	**2.9**	ug/L			1	03/16/18 10:39	03/19/18 16:16		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
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(920)469-2436

ANALYTICAL RESULTS

Project: JANESVILLE
Pace Project No.: 40165960

Sample: DISCRETE #1 **Lab ID: 40165960001** Collected: 03/14/18 15:00 Received: 03/15/18 09:50 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV PAH by HVI	Analytical Method: EPA 8270 by HVI Preparation Method: EPA 3510								
Surrogates									
2-Fluorobiphenyl (S)	46	%	35-84		1	03/16/18 10:39	03/19/18 16:16	321-60-8	
Terphenyl-d14 (S)	25	%	10-129		1	03/16/18 10:39	03/19/18 16:16	1718-51-0	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**2160**	mg/L	100	47.5	1		03/19/18 16:45		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: JANESVILLE
Pace Project No.: 40165960

Sample: DISCRETE #2 **Lab ID: 40165960002** Collected: 03/14/18 16:00 Received: 03/15/18 09:50 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8082 GCS PCB	Analytical Method: EPA 8082 Preparation Method: EPA 3510								
PCB-1016 (Aroclor 1016)	**<0.27**	ug/L	0.54	0.27	1	03/19/18 09:30	03/21/18 05:01	12674-11-2	
PCB-1221 (Aroclor 1221)	**<0.27**	ug/L	0.54	0.27	1	03/19/18 09:30	03/21/18 05:01	11104-28-2	
PCB-1232 (Aroclor 1232)	**<0.27**	ug/L	0.54	0.27	1	03/19/18 09:30	03/21/18 05:01	11141-16-5	
PCB-1242 (Aroclor 1242)	**<0.27**	ug/L	0.54	0.27	1	03/19/18 09:30	03/21/18 05:01	53469-21-9	
PCB-1248 (Aroclor 1248)	**<0.27**	ug/L	0.54	0.27	1	03/19/18 09:30	03/21/18 05:01	12672-29-6	
PCB-1254 (Aroclor 1254)	**<0.27**	ug/L	0.54	0.27	1	03/19/18 09:30	03/21/18 05:01	11097-69-1	
PCB-1260 (Aroclor 1260)	**<0.27**	ug/L	0.54	0.27	1	03/19/18 09:30	03/21/18 05:01	11096-82-5	
PCB, Total	**<0.27**	ug/L	0.54	0.27	1	03/19/18 09:30	03/21/18 05:01	1336-36-3	
Surrogates									
Tetrachloro-m-xylene (S)	75	%	44-121		1	03/19/18 09:30	03/21/18 05:01	877-09-8	
Decachlorobiphenyl (S)	66	%	10-119		1	03/19/18 09:30	03/21/18 05:01	2051-24-3	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Arsenic	**9.8J**	ug/L	25.0	8.3	1	03/19/18 07:29	03/19/18 16:24	7440-38-2	
Barium	**380**	ug/L	5.0	1.5	1	03/19/18 07:29	03/19/18 16:24	7440-39-3	
Cadmium	**1.4J**	ug/L	5.0	1.3	1	03/19/18 07:29	03/19/18 16:24	7440-43-9	
Chromium	**54.9**	ug/L	10.0	2.5	1	03/19/18 07:29	03/19/18 16:24	7440-47-3	
Lead	**177**	ug/L	13.0	4.3	1	03/19/18 07:29	03/19/18 16:24	7439-92-1	
Selenium	**<16.6**	ug/L	50.0	16.6	1	03/19/18 07:29	03/19/18 16:24	7782-49-2	
Silver	**<3.3**	ug/L	10.0	3.3	1	03/19/18 07:29	03/19/18 16:24	7440-22-4	
Zinc	**310**	ug/L	40.0	9.3	1	03/19/18 07:29	03/19/18 16:24	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**0.71**	ug/L	0.42	0.13	1	03/19/18 11:10	03/20/18 12:15	7439-97-6	
8270 MSSV PAH by HVI	Analytical Method: EPA 8270 by HVI Preparation Method: EPA 3510								
Acenaphthene	**0.030**	ug/L	0.030	0.0060	1	03/21/18 08:39	03/21/18 19:48	83-32-9	
Acenaphthylene	**0.017J**	ug/L	0.024	0.0049	1	03/21/18 08:39	03/21/18 19:48	208-96-8	
Anthracene	**0.049J**	ug/L	0.051	0.010	1	03/21/18 08:39	03/21/18 19:48	120-12-7	
Benzo(a)anthracene	**0.22**	ug/L	0.037	0.0074	1	03/21/18 08:39	03/21/18 19:48	56-55-3	
Benzo(a)pyrene	**0.31**	ug/L	0.052	0.010	1	03/21/18 08:39	03/21/18 19:48	50-32-8	
Benzo(b)fluoranthene	**0.54**	ug/L	0.028	0.0056	1	03/21/18 08:39	03/21/18 19:48	205-99-2	
Benzo(g,h,i)perylene	**0.34**	ug/L	0.033	0.0066	1	03/21/18 08:39	03/21/18 19:48	191-24-2	
Benzo(k)fluoranthene	**0.23**	ug/L	0.037	0.0074	1	03/21/18 08:39	03/21/18 19:48	207-08-9	
Chrysene	**0.49**	ug/L	0.064	0.013	1	03/21/18 08:39	03/21/18 19:48	218-01-9	
Dibenz(a,h)anthracene	**0.048J**	ug/L	0.049	0.0098	1	03/21/18 08:39	03/21/18 19:48	53-70-3	
Fluoranthene	**0.94**	ug/L	0.052	0.010	1	03/21/18 08:39	03/21/18 19:48	206-44-0	
Fluorene	**0.031J**	ug/L	0.039	0.0078	1	03/21/18 08:39	03/21/18 19:48	86-73-7	
Indeno(1,2,3-cd)pyrene	**0.26**	ug/L	0.086	0.017	1	03/21/18 08:39	03/21/18 19:48	193-39-5	
1-Methylnaphthalene	**0.011J**	ug/L	0.029	0.0058	1	03/21/18 08:39	03/21/18 19:48	90-12-0	
2-Methylnaphthalene	**0.0070J**	ug/L	0.024	0.0048	1	03/21/18 08:39	03/21/18 19:48	91-57-6	
Naphthalene	**<0.018**	ug/L	0.090	0.018	1	03/21/18 08:39	03/21/18 19:48	91-20-3	
Phenanthrene	**0.50**	ug/L	0.068	0.014	1	03/21/18 08:39	03/21/18 19:48	85-01-8	
Pyrene	**0.76**	ug/L	0.038	0.0075	1	03/21/18 08:39	03/21/18 19:48	129-00-0	
Total PAHs	**4.8**	ug/L			1	03/21/18 08:39	03/21/18 19:48		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
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ANALYTICAL RESULTS

Project: JANESVILLE
Pace Project No.: 40165960

Sample: DISCRETE #2 **Lab ID: 40165960002** Collected: 03/14/18 16:00 Received: 03/15/18 09:50 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV PAH by HVI	Analytical Method: EPA 8270 by HVI Preparation Method: EPA 3510								
Surrogates									
2-Fluorobiphenyl (S)	49	%	35-84		1	03/21/18 08:39	03/21/18 19:48	321-60-8	
Terphenyl-d14 (S)	25	%	10-129		1	03/21/18 08:39	03/21/18 19:48	1718-51-0	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1800**	mg/L	50.0	23.8	1		03/19/18 16:45		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: JANESVILLE
Pace Project No.: 40165960

Sample: COMPOSITE **Lab ID: 40165960003** Collected: 03/14/18 17:00 Received: 03/15/18 09:50 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8082 GCS PCB	Analytical Method: EPA 8082 Preparation Method: EPA 3510								
PCB-1016 (Aroclor 1016)	**<0.24**	ug/L	0.48	0.24	1	03/19/18 09:30	03/21/18 05:25	12674-11-2	
PCB-1221 (Aroclor 1221)	**<0.24**	ug/L	0.48	0.24	1	03/19/18 09:30	03/21/18 05:25	11104-28-2	
PCB-1232 (Aroclor 1232)	**<0.24**	ug/L	0.48	0.24	1	03/19/18 09:30	03/21/18 05:25	11141-16-5	
PCB-1242 (Aroclor 1242)	**<0.24**	ug/L	0.48	0.24	1	03/19/18 09:30	03/21/18 05:25	53469-21-9	
PCB-1248 (Aroclor 1248)	**<0.24**	ug/L	0.48	0.24	1	03/19/18 09:30	03/21/18 05:25	12672-29-6	
PCB-1254 (Aroclor 1254)	**<0.24**	ug/L	0.48	0.24	1	03/19/18 09:30	03/21/18 05:25	11097-69-1	
PCB-1260 (Aroclor 1260)	**<0.24**	ug/L	0.48	0.24	1	03/19/18 09:30	03/21/18 05:25	11096-82-5	
PCB, Total	**<0.24**	ug/L	0.48	0.24	1	03/19/18 09:30	03/21/18 05:25	1336-36-3	
Surrogates									
Tetrachloro-m-xylene (S)	69	%	44-121		1	03/19/18 09:30	03/21/18 05:25	877-09-8	
Decachlorobiphenyl (S)	56	%	10-119		1	03/19/18 09:30	03/21/18 05:25	2051-24-3	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Arsenic	**9.6J**	ug/L	25.0	8.3	1	03/19/18 07:29	03/19/18 16:26	7440-38-2	
Barium	**275**	ug/L	5.0	1.5	1	03/19/18 07:29	03/19/18 16:26	7440-39-3	
Cadmium	**<1.3**	ug/L	5.0	1.3	1	03/19/18 07:29	03/19/18 16:26	7440-43-9	
Chromium	**37.3**	ug/L	10.0	2.5	1	03/19/18 07:29	03/19/18 16:26	7440-47-3	
Lead	**95.3**	ug/L	13.0	4.3	1	03/19/18 07:29	03/19/18 16:26	7439-92-1	
Selenium	**<16.6**	ug/L	50.0	16.6	1	03/19/18 07:29	03/19/18 16:26	7782-49-2	
Silver	**<3.3**	ug/L	10.0	3.3	1	03/19/18 07:29	03/19/18 16:26	7440-22-4	
Zinc	**194**	ug/L	40.0	9.3	1	03/19/18 07:29	03/19/18 16:26	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**0.19J**	ug/L	0.42	0.13	1	03/19/18 11:10	03/20/18 12:22	7439-97-6	
8270 MSSV PAH by HVI	Analytical Method: EPA 8270 by HVI Preparation Method: EPA 3510								
Acenaphthene	**0.016J**	ug/L	0.028	0.0056	1	03/20/18 08:09	03/20/18 15:22	83-32-9	
Acenaphthylene	**0.019J**	ug/L	0.023	0.0046	1	03/20/18 08:09	03/20/18 15:22	208-96-8	
Anthracene	**0.028J**	ug/L	0.048	0.0097	1	03/20/18 08:09	03/20/18 15:22	120-12-7	
Benzo(a)anthracene	**0.13**	ug/L	0.035	0.0070	1	03/20/18 08:09	03/20/18 15:22	56-55-3	
Benzo(a)pyrene	**0.17**	ug/L	0.049	0.0098	1	03/20/18 08:09	03/20/18 15:22	50-32-8	1q,L2
Benzo(b)fluoranthene	**0.31**	ug/L	0.027	0.0053	1	03/20/18 08:09	03/20/18 15:22	205-99-2	
Benzo(g,h,i)perylene	**0.20**	ug/L	0.031	0.0063	1	03/20/18 08:09	03/20/18 15:22	191-24-2	
Benzo(k)fluoranthene	**0.15**	ug/L	0.035	0.0070	1	03/20/18 08:09	03/20/18 15:22	207-08-9	L2
Chrysene	**0.30**	ug/L	0.060	0.012	1	03/20/18 08:09	03/20/18 15:22	218-01-9	
Dibenz(a,h)anthracene	**0.022J**	ug/L	0.046	0.0093	1	03/20/18 08:09	03/20/18 15:22	53-70-3	
Fluoranthene	**0.60**	ug/L	0.049	0.0099	1	03/20/18 08:09	03/20/18 15:22	206-44-0	
Fluorene	**0.017J**	ug/L	0.037	0.0074	1	03/20/18 08:09	03/20/18 15:22	86-73-7	
Indeno(1,2,3-cd)pyrene	**0.15**	ug/L	0.082	0.016	1	03/20/18 08:09	03/20/18 15:22	193-39-5	
1-Methylnaphthalene	**0.0060J**	ug/L	0.027	0.0055	1	03/20/18 08:09	03/20/18 15:22	90-12-0	
2-Methylnaphthalene	**<0.0045**	ug/L	0.023	0.0045	1	03/20/18 08:09	03/20/18 15:22	91-57-6	
Naphthalene	**<0.017**	ug/L	0.085	0.017	1	03/20/18 08:09	03/20/18 15:22	91-20-3	
Phenanthrene	**0.32**	ug/L	0.064	0.013	1	03/20/18 08:09	03/20/18 15:22	85-01-8	
Pyrene	**0.49**	ug/L	0.035	0.0071	1	03/20/18 08:09	03/20/18 15:22	129-00-0	
Total PAHs	**2.9**	ug/L			1	03/20/18 08:09	03/20/18 15:22		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
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ANALYTICAL RESULTS

Project: JANESVILLE
Pace Project No.: 40165960

Sample: COMPOSITE **Lab ID: 40165960003** Collected: 03/14/18 17:00 Received: 03/15/18 09:50 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV PAH by HVI	Analytical Method: EPA 8270 by HVI Preparation Method: EPA 3510								
Surrogates									
2-Fluorobiphenyl (S)	48	%	35-84		1	03/20/18 08:09	03/20/18 15:22	321-60-8	
Terphenyl-d14 (S)	23	%	10-129		1	03/20/18 08:09	03/20/18 15:22	1718-51-0	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1660**	mg/L	50.0	23.8	1		03/19/18 16:45		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: JANESVILLE
Pace Project No.: 40165960

Sample: DISCRETE **Lab ID: 40165960004** Collected: 03/15/18 11:00 Received: 03/19/18 14:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
1630 Methyl Mercury	Analytical Method: EPA 1630 (1998) Preparation Method: EPA 1630 (1998)								
Methyl Mercury	**1.12**	ng/L	0.0710	0.0176	1	03/20/18 11:12	03/21/18 14:05	7439-97-6	N3

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: JANESVILLE
Pace Project No.: 40165960

Sample: COMPOSITE **Lab ID: 40165960005** Collected: 03/15/18 12:30 Received: 03/19/18 14:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
1630 Methyl Mercury	Analytical Method: EPA 1630 (1998) Preparation Method: EPA 1630 (1998)								
Methyl Mercury	**0.161**	ng/L	0.0691	0.0172	1	03/20/18 11:12	03/21/18 14:11	7439-97-6	B,N3

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: JANESVILLE
Pace Project No.: 40165960

Sample: FIELD BLANK **Lab ID: 40165960006** Collected: 03/15/18 13:00 Received: 03/19/18 14:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
1630 Methyl Mercury	Analytical Method: EPA 1630 (1998) Preparation Method: EPA 1630 (1998)								
Methyl Mercury	**<0.0172**	ng/L	0.0693	0.0172	1	03/20/18 11:12	03/21/18 13:58	7439-97-6	N3

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: JANESVILLE
Pace Project No.: 40165960

QC Batch: 139081 Analysis Method: EPA 1630 (1998)
QC Batch Method: EPA 1630 (1998) Analysis Description: 1630 Methyl Mercury
Associated Lab Samples: 40165960004, 40165960005, 40165960006

METHOD BLANK: 551034 Matrix: Water
Associated Lab Samples: 40165960004, 40165960005, 40165960006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methyl Mercury	ng/L	0.0271J	0.0690	03/21/18 13:31	N3

METHOD BLANK: 551035 Matrix: Water
Associated Lab Samples: 40165960004, 40165960005, 40165960006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methyl Mercury	ng/L	0.0206J	0.0693	03/21/18 13:38	N3

METHOD BLANK: 551036 Matrix: Water
Associated Lab Samples: 40165960004, 40165960005, 40165960006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methyl Mercury	ng/L	<0.0171	0.0689	03/21/18 13:45	N3

LABORATORY CONTROL SAMPLE: 551037

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Methyl Mercury	ng/L	2.01	2.03	101	67-133	N3

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 551038 551039

Parameter	Units	40165960005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Methyl Mercury	ng/L	0.161	2.02	2.02	2.35	2.21	109	102	65-135	6	35	N3

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QUALITY CONTROL DATA

Project: JANESVILLE
Pace Project No.: 40165960

QC Batch: 283620 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 40165960001, 40165960002, 40165960003

METHOD BLANK: 1660822 Matrix: Water
Associated Lab Samples: 40165960001, 40165960002, 40165960003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.13	0.42	03/20/18 12:01	

LABORATORY CONTROL SAMPLE: 1660823

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.0	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1660824 1660825

Parameter	Units	40165918001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.13	5	5	4.2	4.3	84	86	85-115	3	20	M0

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: JANESVILLE
Pace Project No.: 40165960

QC Batch: 283583 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 40165960001, 40165960002, 40165960003

METHOD BLANK: 1660700 Matrix: Water
Associated Lab Samples: 40165960001, 40165960002, 40165960003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	ug/L	<8.3	25.0	03/19/18 15:47	
Barium	ug/L	<1.5	5.0	03/19/18 15:47	
Cadmium	ug/L	<1.3	5.0	03/19/18 15:47	
Chromium	ug/L	<2.5	10.0	03/19/18 15:47	
Lead	ug/L	<4.3	13.0	03/19/18 15:47	
Selenium	ug/L	<16.6	50.0	03/19/18 15:47	
Silver	ug/L	<3.3	10.0	03/19/18 15:47	
Zinc	ug/L	<9.3	40.0	03/19/18 15:47	

LABORATORY CONTROL SAMPLE: 1660701

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	500	482	96	80-120	
Barium	ug/L	500	486	97	80-120	
Cadmium	ug/L	500	488	98	80-120	
Chromium	ug/L	500	501	100	80-120	
Lead	ug/L	500	479	96	80-120	
Selenium	ug/L	500	494	99	80-120	
Silver	ug/L	250	243	97	80-120	
Zinc	ug/L	500	514	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1660702 1660703

Parameter	Units	40165934001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	14.5J	500	500	509	528	99	103	75-125	4	20	
Barium	ug/L	199	500	500	684	698	97	100	75-125	2	20	
Cadmium	ug/L	<1.3	500	500	494	502	99	100	75-125	1	20	
Chromium	ug/L	<2.5	500	500	501	509	100	102	75-125	2	20	
Lead	ug/L	<4.3	500	500	479	496	95	99	75-125	4	20	
Selenium	ug/L	<16.6	500	500	490	507	98	101	75-125	3	20	
Silver	ug/L	<3.3	250	250	248	254	98	101	75-125	2	20	
Zinc	ug/L	27.7J	500	500	521	538	99	102	75-125	3	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: JANESVILLE
Pace Project No.: 40165960

QC Batch: 283597 Analysis Method: EPA 8082
QC Batch Method: EPA 3510 Analysis Description: 8082 GCS PCB
Associated Lab Samples: 40165960001, 40165960002, 40165960003

METHOD BLANK: 1660731 Matrix: Water
Associated Lab Samples: 40165960001, 40165960002, 40165960003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
PCB-1016 (Aroclor 1016)	ug/L	<0.25	0.50	03/21/18 03:02	
PCB-1221 (Aroclor 1221)	ug/L	<0.25	0.50	03/21/18 03:02	
PCB-1232 (Aroclor 1232)	ug/L	<0.25	0.50	03/21/18 03:02	
PCB-1242 (Aroclor 1242)	ug/L	<0.25	0.50	03/21/18 03:02	
PCB-1248 (Aroclor 1248)	ug/L	<0.25	0.50	03/21/18 03:02	
PCB-1254 (Aroclor 1254)	ug/L	<0.25	0.50	03/21/18 03:02	
PCB-1260 (Aroclor 1260)	ug/L	<0.25	0.50	03/21/18 03:02	
Decachlorobiphenyl (S)	%	75	10-119	03/21/18 03:02	
Tetrachloro-m-xylene (S)	%	92	44-121	03/21/18 03:02	

LABORATORY CONTROL SAMPLE & LCSD: 1660732 1660733

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
PCB-1016 (Aroclor 1016)	ug/L		<0.25	<0.25					20	
PCB-1221 (Aroclor 1221)	ug/L		<0.25	<0.25					20	
PCB-1232 (Aroclor 1232)	ug/L		<0.25	<0.25					20	
PCB-1242 (Aroclor 1242)	ug/L		<0.25	<0.25					20	
PCB-1248 (Aroclor 1248)	ug/L		<0.25	<0.25					20	
PCB-1254 (Aroclor 1254)	ug/L		<0.25	<0.25					20	
PCB-1260 (Aroclor 1260)	ug/L	5	4.8	4.6	96	91	63-116	5	20	
Decachlorobiphenyl (S)	%				76	78	10-119			
Tetrachloro-m-xylene (S)	%				93	89	44-121			

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: JANESVILLE
Pace Project No.: 40165960

QC Batch: 283494
QC Batch Method: EPA 3510
Analysis Method: EPA 8270 by HVI
Analysis Description: 8270 Water PAH by HVI
Associated Lab Samples: 40165960001

METHOD BLANK: 1660071 Matrix: Water
Associated Lab Samples: 40165960001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1-Methylnaphthalene	ug/L	<0.0059	0.030	03/19/18 10:10	
2-Methylnaphthalene	ug/L	<0.0049	0.024	03/19/18 10:10	
Acenaphthene	ug/L	<0.0061	0.030	03/19/18 10:10	
Acenaphthylene	ug/L	<0.0050	0.025	03/19/18 10:10	
Anthracene	ug/L	<0.010	0.052	03/19/18 10:10	
Benzo(a)anthracene	ug/L	<0.0076	0.038	03/19/18 10:10	
Benzo(a)pyrene	ug/L	<0.011	0.053	03/19/18 10:10	
Benzo(b)fluoranthene	ug/L	<0.0057	0.029	03/19/18 10:10	
Benzo(g,h,i)perylene	ug/L	<0.0068	0.034	03/19/18 10:10	
Benzo(k)fluoranthene	ug/L	<0.0076	0.038	03/19/18 10:10	
Chrysene	ug/L	<0.013	0.065	03/19/18 10:10	
Dibenz(a,h)anthracene	ug/L	<0.010	0.050	03/19/18 10:10	
Fluoranthene	ug/L	<0.011	0.053	03/19/18 10:10	
Fluorene	ug/L	<0.0080	0.040	03/19/18 10:10	
Indeno(1,2,3-cd)pyrene	ug/L	<0.018	0.088	03/19/18 10:10	
Naphthalene	ug/L	<0.018	0.092	03/19/18 10:10	
Phenanthrene	ug/L	<0.014	0.069	03/19/18 10:10	
Pyrene	ug/L	<0.0076	0.038	03/19/18 10:10	
Total PAHs	ug/L	0.0000000010		03/19/18 10:10	
2-Fluorobiphenyl (S)	%	43	35-84	03/19/18 10:10	
Terphenyl-d14 (S)	%	65	10-129	03/19/18 10:10	

LABORATORY CONTROL SAMPLE & LCSD: 1660072 1660073

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1-Methylnaphthalene	ug/L	2	1.3	1.3	64	63	39-83	2	29	
2-Methylnaphthalene	ug/L	2	1.3	1.2	63	62	38-86	3	32	
Acenaphthene	ug/L	2	1.3	1.3	65	65	35-85	1	27	
Acenaphthylene	ug/L	2	1.3	1.3	67	67	31-88	0	29	
Anthracene	ug/L	2	1.4	1.5	71	77	47-104	9	25	
Benzo(a)anthracene	ug/L	2	1.4	1.5	71	77	36-105	7	20	
Benzo(a)pyrene	ug/L	2	1.4	1.6	71	80	69-117	12	20	
Benzo(b)fluoranthene	ug/L	2	1.4	1.5	71	74	54-107	3	22	
Benzo(g,h,i)perylene	ug/L	2	0.89	0.75	44	38	13-86	16	33	
Benzo(k)fluoranthene	ug/L	2	1.5	1.6	75	81	63-128	7	20	
Chrysene	ug/L	2	1.7	1.8	85	89	69-150	5	20	
Dibenz(a,h)anthracene	ug/L	2	0.77	0.60	39	30	10-87	25	37	
Fluoranthene	ug/L	2	1.6	1.8	82	89	57-103	9	20	
Fluorene	ug/L	2	1.4	1.5	72	75	38-85	4	28	
Indeno(1,2,3-cd)pyrene	ug/L	2	1.3	1.4	66	68	40-111	3	22	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: JANESVILLE
Pace Project No.: 40165960

LABORATORY CONTROL SAMPLE & LCSD: 1660072 1660073

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Naphthalene	ug/L	2	1.2	1.1	59	57	39-82	2	28	
Phenanthrene	ug/L	2	1.6	1.7	78	84	46-96	8	25	
Pyrene	ug/L	2	1.6	1.8	81	89	57-110	8	20	
Total PAHs	ug/L		24.5	25.3				3		
2-Fluorobiphenyl (S)	%				56	56	35-84			
Terphenyl-d14 (S)	%				68	74	10-129			

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QUALITY CONTROL DATA

Project: JANESVILLE
Pace Project No.: 40165960

QC Batch: 283710
QC Batch Method: EPA 3510
Analysis Method: EPA 8270 by HVI
Analysis Description: 8270 Water PAH by HVI
Associated Lab Samples: 40165960003

METHOD BLANK: 1661095 Matrix: Water
Associated Lab Samples: 40165960003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1-Methylnaphthalene	ug/L	<0.0059	0.030	03/20/18 10:10	
2-Methylnaphthalene	ug/L	<0.0049	0.024	03/20/18 10:10	
Acenaphthene	ug/L	<0.0061	0.030	03/20/18 10:10	
Acenaphthylene	ug/L	<0.0050	0.025	03/20/18 10:10	
Anthracene	ug/L	<0.010	0.052	03/20/18 10:10	
Benzo(a)anthracene	ug/L	<0.0076	0.038	03/20/18 10:10	
Benzo(a)pyrene	ug/L	<0.011	0.053	03/20/18 10:10	
Benzo(b)fluoranthene	ug/L	<0.0057	0.029	03/20/18 10:10	
Benzo(g,h,i)perylene	ug/L	<0.0068	0.034	03/20/18 10:10	
Benzo(k)fluoranthene	ug/L	<0.0076	0.038	03/20/18 10:10	
Chrysene	ug/L	<0.013	0.065	03/20/18 10:10	
Dibenz(a,h)anthracene	ug/L	<0.010	0.050	03/20/18 10:10	
Fluoranthene	ug/L	<0.011	0.053	03/20/18 10:10	
Fluorene	ug/L	<0.0080	0.040	03/20/18 10:10	
Indeno(1,2,3-cd)pyrene	ug/L	<0.018	0.088	03/20/18 10:10	
Naphthalene	ug/L	<0.018	0.092	03/20/18 10:10	
Phenanthrene	ug/L	<0.014	0.069	03/20/18 10:10	
Pyrene	ug/L	<0.0076	0.038	03/20/18 10:10	
Total PAHs	ug/L	0.0044		03/20/18 10:10	
2-Fluorobiphenyl (S)	%	54	35-84	03/20/18 10:10	
Terphenyl-d14 (S)	%	71	10-129	03/20/18 10:10	

LABORATORY CONTROL SAMPLE & LCSD: 1661096 1661097

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1-Methylnaphthalene	ug/L	2	1.2	1.1	62	55	39-83	12	29	
2-Methylnaphthalene	ug/L	2	1.2	1.1	62	55	38-86	12	32	
Acenaphthene	ug/L	2	1.3	1.1	63	55	35-85	14	27	
Acenaphthylene	ug/L	2	1.3	1.1	67	57	31-88	16	29	
Anthracene	ug/L	2	1.4	1.1	68	57	47-104	18	25	
Benzo(a)anthracene	ug/L	2	1.5	1.2	75	61	36-105	20	20	
Benzo(a)pyrene	ug/L	2	1.5	1.2	73	62	69-117	16	20	L2
Benzo(b)fluoranthene	ug/L	2	1.5	1.2	74	58	54-107	24	22	R1
Benzo(g,h,i)perylene	ug/L	2	0.91	0.75	45	38	13-86	19	33	
Benzo(k)fluoranthene	ug/L	2	1.4	1.2	72	60	63-128	19	20	L2
Chrysene	ug/L	2	1.7	1.4	83	69	69-150	19	20	
Dibenz(a,h)anthracene	ug/L	2	0.77	0.64	38	32	10-87	18	37	
Fluoranthene	ug/L	2	1.6	1.4	81	68	57-103	17	20	
Fluorene	ug/L	2	1.4	1.2	72	61	38-85	17	28	
Indeno(1,2,3-cd)pyrene	ug/L	2	1.4	1.1	70	57	40-111	22	22	

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

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: JANESVILLE
Pace Project No.: 40165960

LABORATORY CONTROL SAMPLE & LCSD: 1661096 1661097

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Naphthalene	ug/L	2	1.1	1.0	55	50	39-82	10	28	
Phenanthrene	ug/L	2	1.5	1.3	77	65	46-96	16	25	
Pyrene	ug/L	2	1.6	1.4	81	68	57-110	17	20	
Total PAHs	ug/L		24.4	20.5				17		
2-Fluorobiphenyl (S)	%				55	47	35-84			
Terphenyl-d14 (S)	%				67	56	10-129			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: JANESVILLE
Pace Project No.: 40165960

QC Batch: 283870
QC Batch Method: EPA 3510
Analysis Method: EPA 8270 by HVI
Analysis Description: 8270 Water PAH by HVI
Associated Lab Samples: 40165960002

METHOD BLANK: 1661639 Matrix: Water
Associated Lab Samples: 40165960002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1-Methylnaphthalene	ug/L	<0.0059	0.030	03/21/18 14:34	
2-Methylnaphthalene	ug/L	<0.0049	0.024	03/21/18 14:34	
Acenaphthene	ug/L	<0.0061	0.030	03/21/18 14:34	
Acenaphthylene	ug/L	<0.0050	0.025	03/21/18 14:34	
Anthracene	ug/L	<0.010	0.052	03/21/18 14:34	
Benzo(a)anthracene	ug/L	<0.0076	0.038	03/21/18 14:34	
Benzo(a)pyrene	ug/L	<0.011	0.053	03/21/18 14:34	
Benzo(b)fluoranthene	ug/L	<0.0057	0.029	03/21/18 14:34	
Benzo(g,h,i)perylene	ug/L	<0.0068	0.034	03/21/18 14:34	
Benzo(k)fluoranthene	ug/L	<0.0076	0.038	03/21/18 14:34	
Chrysene	ug/L	<0.013	0.065	03/21/18 14:34	
Dibenz(a,h)anthracene	ug/L	<0.010	0.050	03/21/18 14:34	
Fluoranthene	ug/L	<0.011	0.053	03/21/18 14:34	
Fluorene	ug/L	<0.0080	0.040	03/21/18 14:34	
Indeno(1,2,3-cd)pyrene	ug/L	<0.018	0.088	03/21/18 14:34	
Naphthalene	ug/L	<0.018	0.092	03/21/18 14:34	
Phenanthrene	ug/L	<0.014	0.069	03/21/18 14:34	
Pyrene	ug/L	<0.0076	0.038	03/21/18 14:34	
Total PAHs	ug/L	0.023		03/21/18 14:34	
2-Fluorobiphenyl (S)	%	61	35-84	03/21/18 14:34	
Terphenyl-d14 (S)	%	83	10-129	03/21/18 14:34	

LABORATORY CONTROL SAMPLE: 1661640

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1-Methylnaphthalene	ug/L	2	1.5	74	39-83	
2-Methylnaphthalene	ug/L	2	1.5	73	38-86	
Acenaphthene	ug/L	2	1.5	77	35-85	
Acenaphthylene	ug/L	2	1.6	78	31-88	
Anthracene	ug/L	2	1.6	81	47-104	
Benzo(a)anthracene	ug/L	2	1.7	86	36-105	
Benzo(a)pyrene	ug/L	2	1.9	93	69-117	
Benzo(b)fluoranthene	ug/L	2	1.8	88	54-107	
Benzo(g,h,i)perylene	ug/L	2	1.0	51	13-86	
Benzo(k)fluoranthene	ug/L	2	1.8	88	63-128	
Chrysene	ug/L	2	2.0	102	69-150	
Dibenz(a,h)anthracene	ug/L	2	0.84	42	10-87	
Fluoranthene	ug/L	2	2.0	98	57-103	
Fluorene	ug/L	2	1.7	85	38-85	
Indeno(1,2,3-cd)pyrene	ug/L	2	1.7	87	40-111	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: JANESVILLE
Pace Project No.: 40165960

LABORATORY CONTROL SAMPLE: 1661640

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Naphthalene	ug/L	2	1.4	68	39-82	
Phenanthrene	ug/L	2	1.9	95	46-96	
Pyrene	ug/L	2	2.0	98	57-110	
Total PAHs	ug/L		29.3			
2-Fluorobiphenyl (S)	%			68	35-84	
Terphenyl-d14 (S)	%			82	10-129	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1661641 1661642

Parameter	Units	40166142005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1-Methylnaphthalene	ug/L	<0.0058	1.8	2.1	1.2	1.4	65	68	27-86	20	29	
2-Methylnaphthalene	ug/L	<0.0048	1.8	2.1	1.1	1.4	64	67	30-86	20	35	
Acenaphthene	ug/L	<0.0060	1.8	2.1	1.1	1.4	62	69	28-85	25	29	
Acenaphthylene	ug/L	0.012J	1.8	2.1	1.1	1.4	63	69	27-88	23	29	
Anthracene	ug/L	<0.010	1.8	2.1	1.2	1.4	65	69	38-104	21	35	
Benzo(a)anthracene	ug/L	0.0075J	1.8	2.1	1.2	1.5	64	70	10-105	23	28	
Benzo(a)pyrene	ug/L	<0.010	1.8	2.1	1.1	1.5	59	69	10-130	31	26	R1
Benzo(b)fluoranthene	ug/L	0.0071J	1.8	2.1	1.2	1.5	64	73	10-115	28	25	R1
Benzo(g,h,i)perylene	ug/L	0.017J	1.8	2.1	0.55	0.72	29	34	10-87	28	42	
Benzo(k)fluoranthene	ug/L	<0.0074	1.8	2.1	0.99	1.4	55	65	10-133	31	25	R1
Chrysene	ug/L	<0.013	1.8	2.1	1.4	1.8	78	87	17-150	26	24	R1
Dibenz(a,h)anthracene	ug/L	<0.0098	1.8	2.1	0.51	0.62	28	30	10-89	19	49	
Fluoranthene	ug/L	<0.010	1.8	2.1	1.4	1.8	75	85	41-103	26	32	
Fluorene	ug/L	<0.0078	1.8	2.1	1.2	1.5	67	74	32-85	25	28	
Indeno(1,2,3-cd)pyrene	ug/L	<0.017	1.8	2.1	0.91	1.1	50	53	10-111	20	37	
Naphthalene	ug/L	<0.018	1.8	2.1	1.1	1.3	61	64	23-88	20	28	
Phenanthrene	ug/L	<0.014	1.8	2.1	1.3	1.7	73	82	33-96	25	25	
Pyrene	ug/L	<0.0075	1.8	2.1	1.4	1.8	79	87	38-110	24	28	
Total PAHs	ug/L	0.098			19.9	25.4				24		
2-Fluorobiphenyl (S)	%						57	62	35-84			
Terphenyl-d14 (S)	%						62	70	10-129			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: JANESVILLE
Pace Project No.: 40165960

QC Batch: 283627 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 40165960001, 40165960002, 40165960003

METHOD BLANK: 1660838 Matrix: Water
Associated Lab Samples: 40165960001, 40165960002, 40165960003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	<0.48	1.0	03/19/18 16:44	

LABORATORY CONTROL SAMPLE: 1660839

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	100	100	80-120	

SAMPLE DUPLICATE: 1660840

Parameter	Units	40166007002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	12.8	12.6	2	5	

SAMPLE DUPLICATE: 1660841

Parameter	Units	40166016002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	1070	1010	6	5	R1

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALIFIERS

Project: JANESVILLE
Pace Project No.: 40165960

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 LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

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 at or above the adjusted LOD.

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-DUL	Pace Analytical Services - Duluth
PASI-G	Pace Analytical Services - Green Bay

BATCH QUALIFIERS

Batch: 283555

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

Batch: 283687

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

Batch: 283763

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

ANALYTE QUALIFIERS

1q	The re-extraction for this sample failed due to contamination in the method blank. There is insufficient sample volume to extract a third time.
B	Analyte was detected in the associated method blank.
L2	Analyte recovery in the laboratory control sample (LCS) was below QC limits. Results may be biased low.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
N3	Accreditation is not offered by the relevant laboratory accrediting body for this parameter.
R1	RPD value was outside control limits.

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: JANESVILLE
Pace Project No.: 40165960

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40165960004	**DISCRETE**	EPA 1630 (1998)	139081	EPA 1630 (1998)	139088
40165960005	**COMPOSITE**	EPA 1630 (1998)	139081	EPA 1630 (1998)	139088
40165960006	**FIELD BLANK**	EPA 1630 (1998)	139081	EPA 1630 (1998)	139088
40165960001	**DISCRETE #1**	EPA 3510	283597	EPA 8082	283687
40165960002	**DISCRETE #2**	EPA 3510	283597	EPA 8082	283687
40165960003	**COMPOSITE**	EPA 3510	283597	EPA 8082	283687
40165960001	**DISCRETE #1**	EPA 3010	283583	EPA 6010	283668
40165960002	**DISCRETE #2**	EPA 3010	283583	EPA 6010	283668
40165960003	**COMPOSITE**	EPA 3010	283583	EPA 6010	283668
40165960001	**DISCRETE #1**	EPA 7470	283620	EPA 7470	283665
40165960002	**DISCRETE #2**	EPA 7470	283620	EPA 7470	283665
40165960003	**COMPOSITE**	EPA 7470	283620	EPA 7470	283665
40165960001	**DISCRETE #1**	EPA 3510	283494	EPA 8270 by HVI	283555
40165960002	**DISCRETE #2**	EPA 3510	283870	EPA 8270 by HVI	283952
40165960003	**COMPOSITE**	EPA 3510	283710	EPA 8270 by HVI	283763
40165960001	**DISCRETE #1**	SM 2540D	283627		
40165960002	**DISCRETE #2**	SM 2540D	283627		
40165960003	**COMPOSITE**	SM 2540D	283627		

REPORT OF LABORATORY ANALYSIS

40165960

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page : 1 Of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	EnviroAnalytics Group	Report To:	Riley Underwood	Attention:	
Address:	1650 Des Peres Road	Copy To:		Company Name:	
Suite 303, St. Louis, MO 63131				Address:	
Email:		Purchase Order #:		Pace Quote:	
Phone:	Fax:	Project Name:	Methyl Mercury	Pace Project Manager:	heather.zika@pacelabs.com,
Requested Due Date:	ASAP	Project #:		Pace Profile #:	

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test: Y/N	Methyl Mercury	Field Blank	Residual Chlorine (Y/N)	
1	Discrete			3/15	11:00				1				X						X			004
2	Composite			↓	12:30				1				X						X			005
3	Field Blank			↓	13:00				1	X										X		006
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						

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

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
Please pour DI into empty while in the field for the field blank sample.					3/16/18	10:00	6.5	Y	N	Y

SAMPLER NAME AND SIGNATURE			
PRINT Name of SAMPLER:	Riley Underwood		
SIGNATURE of SAMPLER:	Riley Underwood	DATE Signed:	3/15/18

TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

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UPPER MIDWEST REGION
MN: 612-607-1700 WI: 920-469-2436

Page 1 of

40165960

CHAIN OF CUSTODY

*Preservation Codes
A=None B=HCL C=H2SO4 D=HNO3 E=DI Water F=Methanol G=NaOH
H=Sodium Bisulfate Solution I=Sodium Thiosulfate J=Other

(Please Print Clearly)	
Company Name:	EAG
Branch/Location:	Jane
Project Contact:	Riley Underwood
Phone:	636-577-5056
Project Number:	
Project Name:	Janesville
Project State:	
Sampled By (Print):	Riley Underw
Sampled By (Sign):	
PO #:	Regulatory Program:

Data Package Options (billable)
☐ EPA
☐ EPA Level

MS/MSD
☐ On your sample (billable)
☐ NOT needed on your sample

Matrix Codes

A = Air	W = Water
B = Biota	DW = Drinking Water
C = Charcoal	GW = Ground Water
O = Oil	SW = Surface Water
S = Soil	WW = Waste Water
SI = Sludge	WP = Wipe

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	FILTERED? (YES/NO) Y/N	PRESERVATION (CODE)* Pick Letter	Analyses Requested: PCB	PAH 8270/SIM	RCRA Metals & Zinc	TSS
001	Discrete #1						X	X	X	X
002	Discrete #2						X	X	X	X
003	Composite						X	X	X	X

Quote #:	
Mail To Contact:	runderwood@enviroanalyticsgroup.com
Mail To Company:	
Mail To Address:	
Invoice To Contact:	
Invoice To Company:	
Invoice To Address:	
Invoice To Phone:	

CLIENT COMMENTS

LAB COMMENTS (Lab Use Only)

Profile #

Rush Turnaround Time Requested - Prelims
(Rush TAT subject to approval/surcharge)
Date Needed: ASAP

Transmit Prelim Rush Results by (complete what you want):

Email #1:	
Email #2:	
Telephone:	
Fax:	

Samples on HOLD are subject to special pricing and release of liability

Relinquished By:	Date/Time:	Received By:	Date/Time:
Riley Underwood	3/14/18 18:00		
Relinquished By:	Date/Time:	Received By:	Date/Time:
Riley Underwood			
Relinquished By: FED EX	Date/Time: 3/15/18 0950	Received By:	Date/Time: 3/15/18 0950
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:

PACE Project No.: 40165960

Receipt Temp = 12 °C

Sample Receipt pH OK / Adjusted

Cooler Custody Seal Present / Not Present
Intact / Not Intact

C019a(27Jun2006)

Version 6.0 06/14/06

ORIGINAL

Pace Analytical Services, LLC
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Client Name: EAC

Sample Preservation Receipt Form

Project # 70165960

All containers needing preservation have been checked and noted below: ☒Yes ☐No ☐N/A Lab Std #ID of preservation (if pH adjusted):

Initial when completed: SH Date/ Time:

	Glass							Plastic							Vials						Jars			General			VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
Pace Lab #	AG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP2N	BP2Z	BP3U	BP3C	BP3N	BP3S	DG9A	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	WGFU	WPFU	SP5T	ZPLC	GN						
001	1				2			1					1																	X		2.5 / 5 / 10
002	2				2			1					1																	X		2.5 / 5 / 10
003	2				2			1					1																	X		2.5 / 5 / 10
004																																2.5 / 5 / 10
005																																2.5 / 5 / 10
006																																2.5 / 5 / 10
007																																2.5 / 5 / 10
008																																2.5 / 5 / 10
009																																2.5 / 5 / 10
010																																2.5 / 5 / 10
011																																2.5 / 5 / 10
012																																2.5 / 5 / 10
013																																2.5 / 5 / 10
014																																2.5 / 5 / 10
015																																2.5 / 5 / 10
016																																2.5 / 5 / 10
017																																2.5 / 5 / 10
018																																2.5 / 5 / 10
019																																2.5 / 5 / 10
020																																2.5 / 5 / 10

Exceptions to preservation check: VOA, Coliform, TOC, TOX, TOH, O&G, WI DRO, Phenolics, Other: _____ Headspace in VOA Vials (>6mm) : ☐Yes ☐No ☒N/A ***If yes look in headspace column**

AG1U	1 liter amber glass	BP1U	1 liter plastic unpres	DG9A	40 mL amber ascorbic	JGFU	4 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP2N	500 mL plastic HNO3	DG9T	40 mL amber Na Thio	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH, Znact	VG9U	40 mL clear vial unpres	WPFU	4 oz plastic jar unpres
AG4U	120 mL amber glass unpres	BP3U	250 mL plastic unpres	VG9H	40 mL clear vial HCL		
AG5U	100 mL amber glass unpres	BP3C	250 mL plastic NaOH	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres	BP3S	250 mL plastic H2SO4			GN:	

Pace Analytical 1241 Bellevue Street, Green Bay, WI 54302	Document Name: **Sample Condition Upon Receipt (SCUR)**	Document Revised: 31Jan2018
	Document No.: **F-GB-C-031-rev.06**	Issuing Authority: Pace Green Bay Quality Office

Sample Condition Upon Receipt Form (SCUR)

Client Name: EAG

Project #: **WO# : 40165960**

40165960

Courier: ☐ CS Logistics ☒ Fed Ex ☐ Speedee ☐ UPS ☐ Waltco ☐ Client ☐ Pace Other:

Tracking #: 7800 7117 4313

Custody Seal on Cooler/Box Present: ☐ yes ☒ no Seals intact: ☐ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☒ no Seals intact: ☐ yes ☐ no

Packing Material: ☒ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other

Thermometer Used SR - 50 **Type of Ice:** Wet Blue Dry None ☐ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: 11.5 /Corr: 12

Temp Blank Present: ☐ yes ☒ no **Biological Tissue is Frozen:** ☐ yes ☐ no

Temp should be above freezing to 6°C.
Biota Samples may be received at ≤ 0°C.

Person examining contents:
Date: 3/15/18
Initials: SSM

Chain of Custody Present:	☒Yes ☐No ☐N/A	1. badly ripped SSM 3/15/18
Chain of Custody Filled Out:	☐Yes ☒No ☐N/A	2. No collect date/time/matrix SSM 3/15/18
Chain of Custody Relinquished:	☒Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☐Yes ☒No ☐N/A	4. Name not intact SSM 3/15/18
Samples Arrived within Hold Time:	☒Yes ☐No ☐N/A	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☒No ☐N/A	6.
Rush Turn Around Time Requested:	☒Yes ☐No ☐N/A	7.
Sufficient Volume: ☐Yes ☒No ☐N/A MS/MSD	☐Yes ☒No ☐N/A	8.
Correct Containers Used:	☒Yes ☐No ☐N/A	9.
-Pace Containers Used:	☒Yes ☐No ☐N/A	
-Pace IR Containers Used:	☐Yes ☐No ☒N/A	
Containers Intact:	☐Yes ☒No ☐N/A	10. 001 - 1-liter A received broken, 003 - 1-100mL A received broken
Filtered volume received for Dissolved tests	☐Yes ☐No ☒N/A	11.
Sample Labels match COC:	☐Yes ☒No ☐N/A	12. all samples collected 3/14/18 N/A
-Includes date/time/ID/Analysis Matrix: W		001 - collect time 1500, 002 - 1600, 003 - 1700 SSM 3/15/18
Trip Blank Present:	☐Yes ☐No ☒N/A	13.
Trip Blank Custody Seals Present	☐Yes ☐No ☒N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: If checked, see attached form for additional comments ☐

Person Contacted: Date/Time:

Comments/ Resolution: 003 - 100mL A received w/ cracked lid - potentially contaminated - DO NOT USE stated placed on new, intact lid SSM 3/15/18

Project Manager Review: LW **Date:** 3/15/18

Pace Analytical	Document Name: Sample Condition Upon Receipt Form	Document Revised: 17Apr2017 Page 1 of 1
	Document No.: F-DUL-C-001-rev.04	Issuing Authority: Pace Duluth Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: EnviroAnalytics Group

Project #: 40165760

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: **Temp Blank?** ☒Yes ☐No

Thermometer Used: ☒ IR-1 ☐ 161014660 **Type of Ice:** ☒Wet (Melted) ☐Blue ☐None ☐Samples on ice, cooling process has begun

Cooler Temp Read °C: 6.5 **Cooler Temp Corrected °C:** 6.5 **Biological Tissue Frozen?** ☐Yes ☐No ☒NA

Temp should be above freezing to 6°C Correction Factor: 0.0 **Date and Initials of Person Examining Contents:** KNH 3/16/18

If temperature is ≤0°C, is there evidence of ice formation? ☐Yes ☐No ☒NA

				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. 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. ASAP
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? -Includes Date/Time/ID/Analysis Matrix: wt	☒Yes	☐No	☐N/A	12.
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: KW **Date:** 3/19/16

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)

40165960

Pace Analytical®	Document Name: Permission to Test Samples	Document Revised: 10Mar2015 Page 1 of 1
	Document No.: F-VM-C-029 Rev.02	Issuing Authority: Pace Virginia Minnesota Quality Office

To: Clients

From: Pace Sample Receiving

Re: Permission to Test samples

Pace Analytical Services is certified by the Minnesota Department of Health. The current certification rules require us to document your permission to analyze any samples received over 6°C or past recommended holding time.

To ensure prompt handling of your samples please complete this form by selecting from the options below. Please sign and date this form and return it with your samples. If you have any questions please call us at 218-735-6700.

Thank you!

If my samples arrive at the laboratory over 6°C, please:

- ☒ Please analyze the samples.
- ☐ Please contact me.
- ☐ Reject the samples and notify me.

If my samples for Fecal Coliform Bacteria testing are received more than 8 hours but less than 24 hours, please:

- ☐ Please analyze the samples.
- ☐ Reject the samples and notify me.
- ☐ Please analyze samples >24 hours.

If my samples arrive past the recommended hold time, please:

- ☐ Please analyze the samples.
- ☐ Reject the samples and notify me.
- ☐ Please analyze and notify me.

Organization: EAG

Print Name: Riley Underwood

Sign Name: Riley Underwood

Date: 3/15/18

INFRASTRUCTURE ALTERNATIVES, INC.

March 26, 2018

Mr. Dan Dunn
EnviroAnalytics Group
1650 Des Peres Road, Suite 230
St. Louis, MO 63131

ROCK RIVER TREATABILITY REPORT

Mr. Dunn,

Infrastructure Alternatives, Inc. (IAI) was contracted by EnviroAnalytics Group to perform treatability testing on sediment from Rock River in Janesville, WI. On March 15, 2018, samples were picked up from the site by IAI. Two 5-gallon buckets of sediment and three 5-gallon buckets of surface water were brought back to IAI's Rockford, MI lab, for testing.

IAI first determined the in-situ solids content of the material. Surface water from the site was then added to the sediment, creating a mixture that is similar in solids content to a typical hydraulic dredge slurry. Then, an initial group of coagulant and flocculant products was selected, representing a wide range of charges and molecular weights. Each product was introduced to small aliquots of the sediment slurry, mixed, and observed for floc formation, floc size, settling rate, and water clarity. This process was then repeated, selecting the best performing product in each group, and testing it alongside an ever-narrowing range of charge and molecular weight products, until the best performing product (or combination of products) was found. It was determined that FLOPAM EMF 240 CT PWG, a polymer product from SNF Holding Co., provides an effective means for flocculating this material, suitably for geotextile tube dewatering, at a dose of 2.86 lbs./dry ton.

The sediment slurry, diluted to best represent that of a hydraulic dredge, was then mixed with the polymer at the correct dosage rate, and put through a hanging bag test. The hanging bag (U.S. Filter) was provided to IAI by the client. A total of 30 liters of sediment slurry and corresponding polymer were poured into the bag and observed.

Evaluations indicate this material can be effectively dewatered in geotextile tubes. An initial blush of turbid water did pass through the bag within the first few seconds. However, this is typical of hanging bag tests. After the initial blush, the filtrate appeared clear and of good quality. Both the initial blush and the clear filtrate were collected and kept separately. The hanging bag was monitored for three days, with filtrate turbidity and filtrate volume being recording at specific time intervals. The clear filtrate was then sent to Pace Analytical for further testing.

Please let us know if you have any questions about this report. We welcome an opportunity to work further with EnviroAnalytics Group, as a technical approach is developed for this project.

Sincerely,
INFRASTRUCTURE ALTERNATIVES, INC.

Connor McNeely, Chemist
616. 916.1160

Enclosed: Hanging Bag Test Summary
Photo Log
FLOPAM EMF 240 CT PWG Safety Data Sheet

INFRASTRUCTURE ALTERNATIVES, INC.

Project ID:	Rock River	Date:	3/19/2018
Location:	Janesville, WI	Time:	15:00

In-situ % Solids:	37.40%	Water Added (L):	19.5
Slurry % Solids:	11.16%	Sediment Added (L):	10.5
GDT % Solids after 24 hours:	43.18%	Polymer Used (lb/DT):	2.86
GDT % Solids after 3 days:	43.27%	Polymer Added (mL)	1000

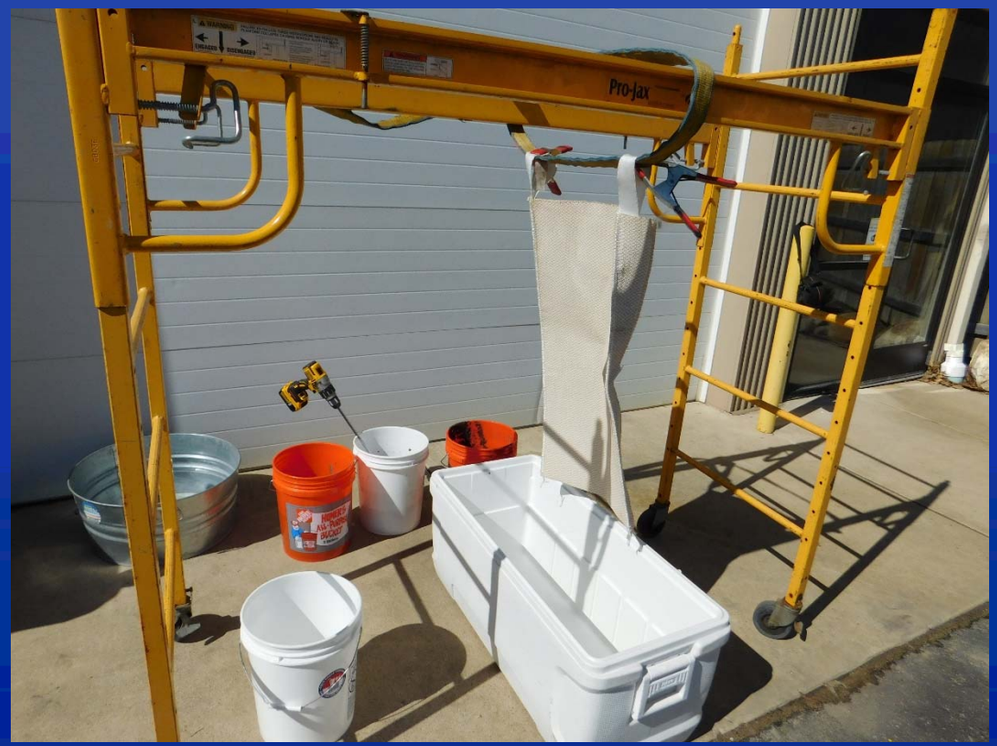
Filtrate Total Suspended Solids: 11 mg/L

Time (Min.)	Pore Water Collected (mL)	Estimated Pore Water Flow Rate (mL/min)	Pore Water Turbidity (NTU)	
0-1	7400	3700.0000	569	
1-5	9150	3050.0000	5.98	
5-10	1450	290.0000	9.17	
10-30	680	34.0000	5.42	
30-60	250	8.3333	3.86	
24 hr	200	0.1449	11.4	
Total	19130			

Note: Immediately after pouring the slurry into the hanging bag, an initial blush of dirty water passed through the bag. The initial blush was collected separately from the rest of the filtrate, and did not influence the readings after the first measurement.

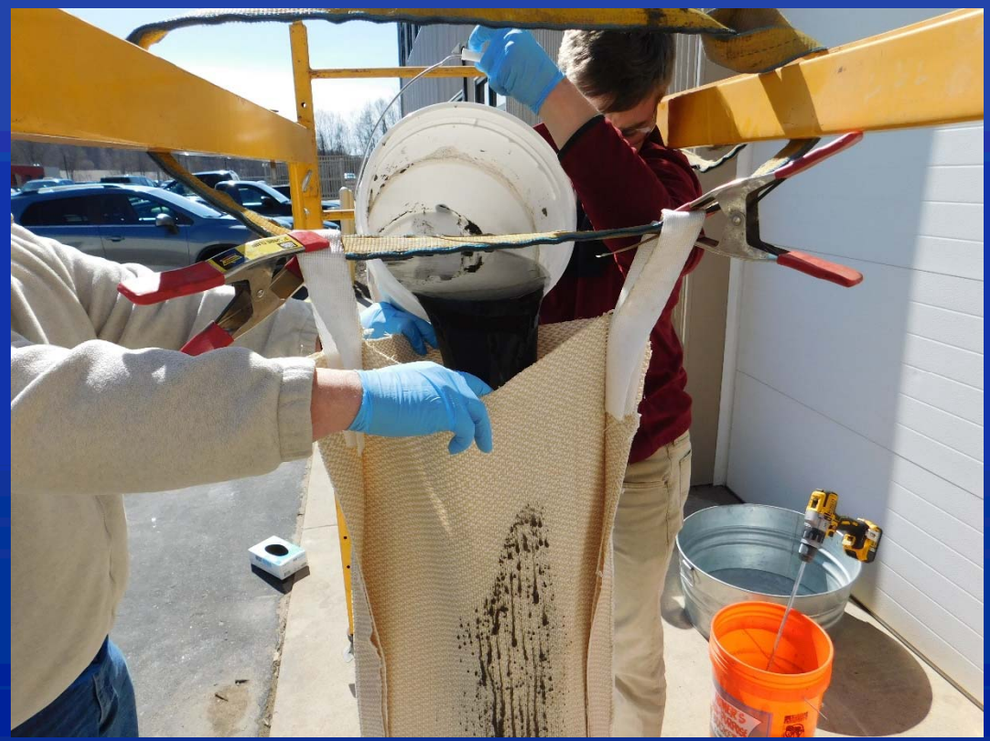
7888 Childsdale Ave. NE | Rockford, MI 49341 | Phone 616.866.1600 | Fax 616.866.1611
info@iaiwater.com | www.iaiwater.com

2018-03-19 Hanging Bag Setup



2018-03-19 Sediment Slurry

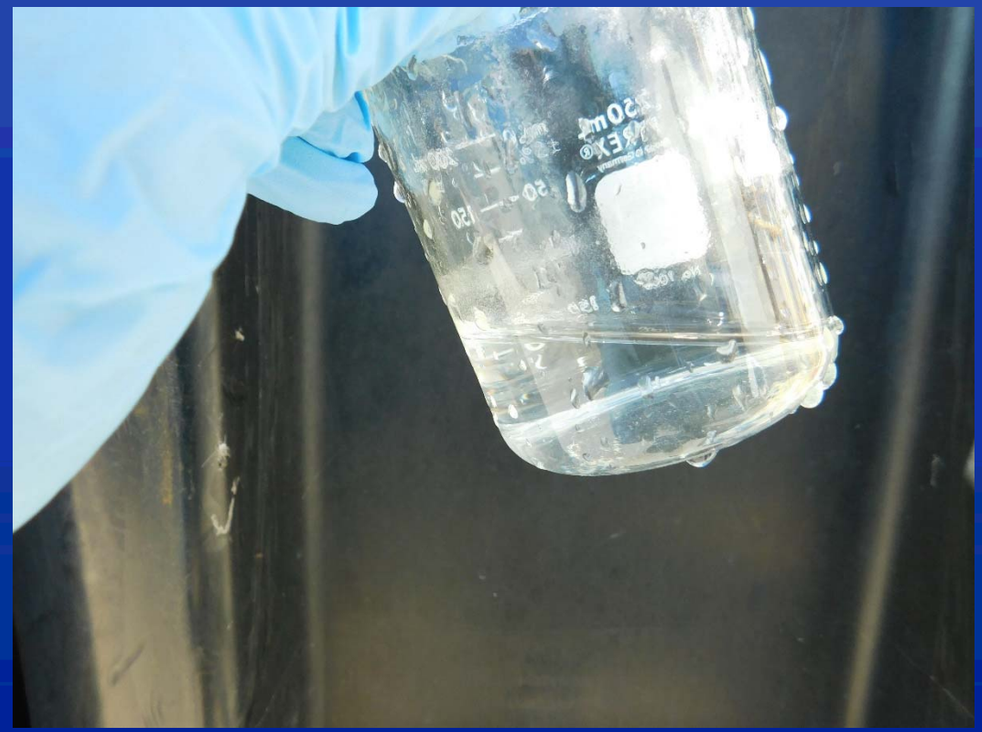
2018-03-19 First Pour



2018-03-19 Initial Blush

2018-03-19 Clear Filtrate

2018-03-19 Sample of Clear Filtrate



2018-03-19 Collection of Clear Filtrate

2018-03-19 Clear Filtrate Collected Separately

ATTACHMENT C Sampling and Analses Plan (SAP) with QAPP

SAMPLING AND ANALYSIS PLAN/QUALITY ASSURANCE PROJECT PLAN

ROCK RIVER SEDIMENT REMOVAL PROJECT

JANESVILLE, WISCONSIN

BRRTS Activity # 02-54-577951

Prepared For:

JAINES, LLC

1650 Des Peres Rd., Suite 303

St. Louis, MO 63131

Prepared By:

EnviroAnalytics Group

1650 Des Peres Rd, Suite 230

St. Louis, MO 63131

(314)835-1515

JUNE 2018

TABLE OF CONTENTS

FIGURES

ATTACHMENTS

SECTION 1 INTRODUCTION

This Sampling and Analysis Plan (SAP)/Quality Assurance Project Plan (QAPP) was prepared for Jaines, LLC by EnviroAnalytics Group, LLC (EAG) for the Rock River Sediment Removal Project for the former GM Assembly Plant located at 1000 General Motors Drive in Janesville, Wisconsin. This QAPP/SAP is provided in support of the March 2018 Remedial Action Design Report (RADR) for the site.

The purpose of this document is to ensure that scientific data are acquired according to established methods and procedures designed to obtain results that are objective, true, repeatable, and of known accuracy. Specifically, this SAP/QAPP provides guidance and specifications to ensure that the RADR activities are planned and executed in a manner consistent with the quality assurance objectives stated below:

- Field determinations and analytical results are valid;
- Calibration and preventive maintenance of equipment is completed;
- Samples are identified and controlled through chain of custody procedures;
- Records are retained as documentary evidence of field activities and observations;
- Generated data are validated in accordance with respective data validation guidelines; and
- Evaluations of the data are accurate, appropriate and consistent throughout the project.

This SAP/QAPP includes:

- Data Quality Objectives and Project Scope;
- Project Organization and Responsibilities;
- Sample Collection and Field Data Acquisition Procedures;
- Sample Analysis and Laboratory Data Deliverable Format;
- Sample Quality Assurance; and
- Quality Control Procedures.

SECTION 2 BACKGROUND

2.1 REMEDIAL ACTION AREA (RAA) DESCRIPTION

The RAA occurs along a 500-ft reach of the Rock River and is approximately 2.1 acres in area. Sediments near the Adjacent Outfall where storm water from the former Assembly Plant discharged along Delavan Drive in Janesville were identified to contain contaminants of concern (COC's), including polycyclic aromatic hydrocarbons (PAHs), lead, mercury, and polychlorinated biphenyls (PCBs). Figures of the location and site area can be found in Figure 1 and Figure 2, respectively.

2.2 OPERATIONAL HISTORY

The RAA lies at the outfall of a former GM vehicular Assembly Plant. The primary production processes at the plant involved large scale vehicular assembly. Operations conducted at the plant in support of the manufacturing activities included receipt and storage of raw materials, hazardous and non-hazardous waste management, equipment and vehicle maintenance activities, product and materials testing, wastewater treatment, and shipment of final goods. Portions of the plant, primarily those located along the surrounding roadways, were also historically utilized for a variety of other industrial, commercial, and residential uses, including, but not limited to: gas/filling/service stations, warehouses, and residences. The Plant was shut down in 2009 and is currently undergoing demolition.

2.3 PREVIOUS INVESTIGATIONS/REGULATORY INVOLVEMENT

Multiple site investigations and remedial evaluations were conducted by GM consultants and documented in the Sediment Investigation Report (GHD Report No. 21, May 2016), the Rock River Site Investigation Report (GHD Report No. 30, May 2017), and the Remedial Action Options Report (GHD Report No. 32, May 2017). Additional information regarding the sedimentation in the affected reach of the Rock River has previously been presented in studies completed for the City as part of the Monterey Dam demolition planning (Inter-Fluve, Inc., 2015).

SECTION 3 DATA QUALITY OBJECTIVES

3.0 DATA USE BACKGROUND

The overall objective of the RADR is to remove potential threats to the benthic invertebrate community in the vicinity of a Site-related storm water outfall that empties into a small stretch of the Rock River.

Sediments from the Remedial Action Area shall be hydraulically dredged using a shrouded submersible pump. Bathymetric survey shall be completed to document the initial and final conditions. Additional intermediate surveys shall be conducted in smaller dredged units to document progress. These surveys shall include probing to sound the river bottom at a minimum of three locations within each dredged unit. If the sonar and/or probing indicates the presence of measurable sediments greater than two inches thick, a petite ponar sampler will be dropped to collect a sample of any loose material remaining on the river bed. The contents shall be visually inspected upon retrieval. Additional dredging shall be conducted if a fine-grained layer greater than two inches thick is observed and the confirmation process shall be repeated. If the sediment thickness is less than two inches or represents less than 25% of the sample volume, the dredging shall be deemed complete within that dredged unit area. If fine-grained material greater than two inches thick or representing more than 25% of the ponar volume is observed during a subsequent event, the fine-grained material shall be segregated by screening through a #40 sieve and submitted to the analytical laboratory for analyses of metals, polynuclear aromatic hydrocarbons (PAHs) and poly-chlorinated biphenyls (PCBs). The analytical results shall be compared to the Tables 1, 2, and 3 presented in WDNR's Consensus-Based Sediment Quality Guidelines.

The following data quality objectives (DQOs) have been identified for the RADR:

1) Obtain water quality data upstream and downstream of the remedial action area to verify dredging activities do not have an adverse impact on surface water quality
2) Obtain water quality data of the dredged slurry to optimize polymer requirements for solid separation
3) Obtain water quality data of the carriage water to verify that the discharge meets effluent limits
4) Verify sediment volumes below surface water prior, during and after remedial actions to determine sediment volumes and confirm sediment has been removed to refusal (i.e. gravel)
5) Obtain discharge water flow rates and volumes
6) Characterize dry sediment to determine beneficial re-use/offsite disposal
7) Obtain soil moisture data for dewater verification
8) Obtain soil geotechnical data for dry sediment for characterization if offsite disposal is required

3.1 MEASUREMENT QUALITY OBJECTIVES FOR DATA MANAGEMENT

Proficiency information on all laboratory reports will include precision, bias accuracy, representativeness, completeness, comparability, and sensitivity. The QC acceptance ranges and limits for all analytes are shown in each laboratory's QAPP, in the tables, and used as part of the data validation process.

3.1.1 Precision

Precision, relative percent difference may be defined as the degree of agreement among measurements resulting from the application of the same process under equivalent conditions. Two types of precision, analytical precision and total precision, may be assessed. Analytical precision is a measure of variability between two duplicate or replicate analyses, for example, evaluation of duplicate laboratory control sample (LCS) recoveries. Total precision is a measurement of the overall variability of the sampling and analytical process. Analysis of field duplicate or replicate samples is a means to determine total precision. Matrix spike duplicate and field duplicates are analyzed to determine field and analytical precision. As a special case, for metals analysis, a control limit of 10 RPD (relative percent difference) will be used for matrix spike (MS) and matrix spike duplicate (MSD) sample values greater than or equal to 5 times the method detection limit. If A and B are values determined by the duplicate analyses, then the RPD is calculated using the formula:

$$\mathrm{RPD} = \frac{A - B}{(A + B)/2} \times 100\%$$

3.1.2 Bias

Bias refers to the systematic or persistent distortion of a measurement process that causes errors in one direction. Bias assessments are based upon the analysis of spiked samples via an LCS. The percent recovery (%R) of the compounds spiked into a matrix-free solution, such as deionized water, is used to evaluate the accuracy of the environmental analytical process. The recovery of an analyte from an LCS sample is indicative of the impact, either high or low, that a specific analytical procedure may have on the accuracy of a specific compound or element. Bias is calculated using the formula:

$$\mathrm{Bias} = \frac{\mathrm{LCS\,result}}{\mathrm{LCS\,"true\,value"}} \times 100\%$$

3.1.3 Accuracy

Accuracy is a measure of the closeness of an observed value to the "true" value, for example, theoretical or reference value, or population mean. The percent recovery (%R) of the compounds spiked into a matrix via LCSs or MS/MSDs along with surrogates, is used to evaluate the accuracy of the

environmental sampling process. The recovery of an analyte from the LCS, an MS/MSD, and surrogate spikes is indicative of the impact a specific matrix may have on the accuracy of a compound or element. Percent recovery is calculated using the formula:

$$\%R = \frac{\text{Spiked sample result - Unspiked sample result}}{\text{Spike added}} \times 100\%$$

3.2.4 Representativeness

Representativeness, a qualitative measure of the degree to which sample data represent accurately and precisely a characteristic environmental condition, is a subjective parameter used to evaluate the efficacy of the sampling plan design. Representativeness is demonstrated by providing full descriptions of the sampling techniques and the rationale used for selecting sampling locations in the project scoping documents.

3.2.5 Completeness

Completeness is expressed as the percentage of usable data obtained compared to the amount that was expected to be obtained under correct or normal conditions. Data must meet some or all of the acceptance criteria specified in the analytical method used in order to be considered usable and must not include "rejected" data points. Completeness is calculated per analyte of concern, per matrix, and per site. The value is used to evaluate whether sufficient data were acquired from the sampling event. Data validation will determine the amount of valid data obtained from each site. The specific objective for the completeness of this project will be greater than or equal to 90 percent for field and laboratory data for each site and calculated by:

$$\text{Completeness} = \frac{\text{Total acceptable results for an analyte}}{\text{Total results for that analyte}} \times 100\%$$

3.2.6 Comparability

Sample collection, handling techniques, sample matrix type, and analytical method, among others, affect comparability. Data from one phase of an investigation can be compared to another when the same standard methods are used and data package deliverables are similar. Consistency in the acquisition, handling, and analysis of samples is necessary so that results may be compared within regulatory requirements. Recognized and approved analytical methods and quality control will be used to provide analytical results comparable with those obtained throughout this project.

3.2.7 Sensitivity

Sensitivity refers to the required method detection limits (MDLs) and reporting limits (RLs) established to meet the required project-specific DQOs. The reporting and method detection limits may vary since they are matrix and analyte dependent. Analytical parameters and their quantitation limits are presented in the Pace Analytical Services Quality Assurance Manual. A copy of the Quality Assurance Manual cover and Table of Contents is included as Attachment A. The full QAM for Pace is available upon request.

3.3 DATA REVIEW AND VALIDATION

Data review will be carried out by Pace Analytical. Sections 3.4.1 and 3.4.2 are taken from the Pace quality assurance manual (QAM).

3.3.1 Primary Data Review

The primary analyst is responsible for initial data reduction and data review. This includes confirming compliance with required methodology, verifying calculations, evaluating quality control data, noting non-conformances in logbooks or as footnotes or narratives, and uploading analytical results into the LIMS. Data review checklists, either hardcopy or electronic, are used to document the primary data review process. The primary analyst must be clearly identified in all applicable logbooks, spreadsheets, LIMS fields, and data review checklists.

3.3.2 Secondary Data Review

Secondary data review is the process of examining data and accepting or rejecting it based on pre-defined criteria. This review step is designed to ensure that reported data are free from calculation and transcription errors, those quality control parameters are evaluated, and that any non-conformances are properly documented.

3.3.3 Data Review Process

The completed data from the primary analyst is sent to a designated qualified secondary data reviewer (this cannot be the primary analyst). The secondary data reviewer provides an independent technical assessment of the data package and technical review for accuracy according to methods employed and laboratory protocols. This assessment involves a quality control review for use of the proper methodology and detection limits, compliance to quality control protocol and criteria, presence and completeness of required deliverables, and accuracy of calculations and data quantitation. The reviewer validates the data entered into the LIMS and documents approval of manual integrations. Data review checklists, either hardcopy or electronic, are used to document the secondary data review process.

3.4 DATA MANAGEMENT

Data management procedures are established in this SAP to effectively process and archive data such that relevant data descriptions (e.g., sample locations, sample numbers, procedures, methods and analysis) are readily assessable and accurately maintained. Copies of all analytical results, field log datasheets, and chain-of-custody records will be maintained on file at the EAG offices. The project contact must also maintain a complete copy of dredge project records.

Data should be reported according to accepted practices of quality assurance and data validation as outlined in USEPA SW-846, most recent edition. The following data should be included:

- Replicate samples;
- QA/QC samples (including calibration samples and spikes);
- Identification of outlier values;
- Reporting limits; and,
- Reporting of results determined to be below detection limits.

3.5 ASSESSMENT OVERSIGHT

Assessments and oversight practices ensure that all elements of sampling, analysis and data reduction are completed as planned. This is accomplished through a system of internal and external checks such that:

- All elements of the QAPP are implemented as described
- The quality of the data generated by implementation of the QAPP is adequate
- A corrective action plan is in place if unforeseen circumstances force a deviation from the plan

Corrective action procedures used by the laboratories are discussed in each laboratory's QAPP. If corrective action does not result in samples being analyzed in an under-control situation, then all samples affected by the problem must be flagged. For example, if a matrix spiked sample is not within acceptance criteria, then all samples associated with the same sample matrix type in the batch must be flagged.

3.6 DOCUMENTS AND RECORDS

Records for the data reporting package include sample collection records, chains-of-custody, analytical results, associated quality control records (including blank, spike recovery, duplicate, and surrogate recovery data) and a written discussion of the sampling event. All laboratory records associated with the analysis of the samples, including the QAP, documentation of sample receipt, standard and reagent preparation logs, instrument run logs, sample preparation logs, instrument maintenance logs and facility maintenance logs (that is, temperature logs, balance calibration logs, and so on) will be stored in accordance with applicable regulations or laboratory standards.

SECTION 4 PROJECT ORGANIZATION AND RESPONSIBILITIES

The Project Manager, Environmental Consultant, Analytical Laboratory and other Subcontractors are described below. If any of the principal personnel, contractors, or subcontractors identified below change, information on the new personnel, contractor or subcontractor will be submitted to the WDER.

Property Owner – Jaines, LLC. The site is owned by Jaines, LLC.

Jaines, LLC
1650 Des Peres Road, Suite 303
St. Louis, Missouri 63131
(314) 835-1515

Legal Representation – Tom Pike. Tom Pike is the in-house legal counsel for Jaines, LLC. His business address is:

Commercial Development Company
Attn: Tom Pike
1650 Des Peres Road, Suite 303
St. Louis, Missouri 63131
(314) 835-2801

Environmental Consultant – EnviroAnalytics Group, LLC. EAG is responsible for the preparation of the RADR (including a Sampling and Analysis Plan, a Health and Safety Plan and this Quality Assurance Project Plan), supervising field subcontractors, and preparing technical reports. Dan Dunn is the EAG Senior Project Manager. His business address is:

1650 Des Peres Road, Suite 230
St. Louis, Missouri 63131
(314) 835-2814

Analytical Laboratory – a Wisconsin certified laboratory will be utilized for performing laboratory analysis. Pace Analytical Services, LLC of Green Bay, Wisconsin (Wisconsin certification number 405132750) has been identified as the laboratory selected to performing the analyses for this project. Its business address is:

1241 Bellevue Street – Suite 9
Green Bay, WI 54302

(920) 469-2436

The Laboratory is responsible for providing analytical services, including laboratory quality assurance and quality control activities. Laboratory sample storage procedures and the laboratory's review and cross-check procedures for the elimination of errors during routine data transfer, in calculations, preparation of data deliverable packages, and off-site storage are detailed in the laboratory's Quality Assurance Manual is attached as Attachment A.

WDNR Primary Contact – Bill Fitzpatrick.

Mr. Bill Fitzpatrick

Wisconsin Department of Natural Resources

101 South Webster Street

Madison, WI 53703

(608) 266-9267

City of Janesville Contact – Paul Woodward.

Mr. Paul Woodward

City of Janesville Director of Public Works

18 North Jackson Street

Janesville, WI 53547

(608) 755-3000

Dredging Subcontractor – The primary subcontractor for dredging has not yet been selected. This information will be updated as subcontractor(s) are chosen and this QAPP will be modified to reflect the changes.

SECTION 5 SAMPLE COLLECTION AND FIELD DATA ACQUISITION PROCEDURES

5.1 SAMPLING PROGRAM

The sections below detail the sampling programs for this project, including sampling media, locations, frequency and procedures. The results of this sampling program will be presented to the Wisconsin Department of Natural Resources as part of the weekly progress report.

5.1.1 Surface Water (Rock River) Sampling

Prior to beginning dredging activities, buoys containing sensors designed to monitor surface water quality parameters will be deployed prior to and during dredging activities. One monitoring station will be established within 100-feet upstream (reference point) of the RAA and a second monitoring station will be established approximately 100-feet downstream (monitoring point) of the RAA. Data at each station will be logged using YSI EXO-1 multiparameter water quality monitors or similar, where it will be recorded daily at the end of dredging operations. A specification sheet for the YSI EXO is attached as Attachment C. Field instruments will be maintained and calibrated properly before each use. Turbidity data obtained from these meters will be collected prior to implementation of the remedial actions for baseline data.

Once remedial actions are initiated, surface water turbidity data from these buoys will be reviewed on a regular basis. In addition, the turbidity of the surface water inside the RAA (silt curtain) will be measured regularly and recorded near the dredging boat. The data obtained from these sampling locations will be utilized to verify that the remedial actions do not have an adverse impact on the surface water quality in the Rock River.

Turbidity conditions and responses to monitoring results will be based on the table below.

Condition	Downstream Monitor relative to Upstream Monitor (NTUs)	Response
Normal	< 20	• Collect readings prior to starting dredging, every 4 hours thereafter, and within 30 minutes of completing dredging for the day.
Elevated	20 - < 50	• Increase readings to every 2 hours.
Warning	50 - < 70	• Inspect pump and shroud. • Document pump location. • Document weather conditions, including precipitation records. • Increase downstream monitoring to continuous, except to check Upstream monitor every 30 minutes.
Stop Work	70 - < 80	• Stop dredging until readings reach Normal condition. • Notify DNR of Stop Work Condition, time, and turbidity readings.
Exceedance	> 80	• Stop dredging until readings reach Normal condition. • Notify DNR of Exceedance Condition, time, and turbidity readings.

5.1.2 Carriage Water Sampling

Once the sediment has been filtered and dewatered from the slurry, the carriage water will be monitored prior to discharge to the Rock River to verify that discharge meets the required limitations. A flow meter will be installed in the discharge pipe to monitor flow rates and volumes. Discrete samples will be collected from a sample valve located near the discharge point in Tank #3 on a routine basis, location shown in Figure 3.

It is proposed that carriage water samples be collected twice daily for the first 3 days of the project plus one per day for the next 3 days of operations. These samples will be submitted to the lab with a request for a

rush analysis (results within 24-hours) and will be considered our start up sampling schedule. Per the permit, if the concentrations of the metals and PAHs listed in the table below are less than 1/5th the water quality-based effluent, (continued) monitoring is not required and these constituents will not be analyzed in future samples. If the results of the analyses of these start up samples are below the allowable permitted discharge limitations, carriage water will be sampled on a weekly basis with standard laboratory turn-around times until the scope of work is complete (pending approval from the WDNR).

Analytical Methods, Containers, Preservations, and Holding Times Requirements for Carriage Water

Analytical Parameter	Analytical Method Number	Containers (number, type, size/volume)	Preservation Requirements (chemical, temperature, light protection)	Maximum Holding Times
PAH's	Method 8270SIM Low Level	1L amber glass bottle	Chill with ice to 4°C	28 days
Metals	Method 6010	250 mL polyethylene bottle	Chill with ice to 4°C pH<2 with HNO_3	6 months
Mercury – Low Level	Method 1631E	1L amber glass bottle	Chill with ice to 4°C 12N HCl or BrCl	48 hours for preserv. or analysis
Oil and Grease	Method 1664A	1L amber glass bottle	Chill with ice to 4°C pH<2 H2SO4 or HCl	28 days
PCB's	Method 8082	1L amber glass bottle	Chill with ice to 4°C	1 year
TSS	SM 2540D	250 mL polyethylene bottle	Chill with ice to 4°C	6 months

5.1.3 Dry Sediment Sampling

The sediment will be dewatered and samples of the dried sediment will be obtained for laboratory analysis per the Sampling and Analysis Plan. The initial stockpile will be sampled at a frequency of one sample from the first 100 cubic yards (CY), one sample will be collected from the first 300 CY, and one sample will be collected from the first 500 CY. The analytical results will be compared to the industrial RCLs. Samples will be collected from every 500 CY stockpile thereafter, assuming the initial three-sample data asset. Sampling

of each stockpile (approximately 500 cubic yards per pile) will be completed to document the soil quality for reuse on site or final disposal offsite. Sampling of the dry sediment will consist of both total elemental analyses and a water-leaching extract. A representative sample from each 500-yard stockpile will be obtained by obtaining a composite sample from 5 discrete locations within each stockpile. The amount of sediment anticipated to be removed (15,000 cubic yards), approximately 32 composite samples will be collected and analyzed. The composite soil samples will be analyzed for the parameters presented in the table below.

Analytical Methods, Containers, Preservations, and Holding Time Requirements for Dry Sediment Sampling				
Analytical Parameter	Analytical Method Number	Containers (number, type, size/volume)	Preservation Requirements (chemical, temperature, light protection)	Maximum Holding Times
Total Metals (8 RCRA)	SW-846 Method 6010/7470	(2) 4 oz glass jar	Chill with ice to 4°C	<180 days <28 days for Hg
PCB's	Method 8082	8 oz glass jar	Chill with ice to 4°C	14 days
PAH's	Method 8270	8 oz glass jar	Chill with ice to 4°C	40 days

It is the intent to reuse the dry sediment on the former General Motors site (zoned Industrial) once demolition is complete and a redevelopment plan is in place. However, if the concentrations of the chemicals of potential concern require that a portion of the dry sediment be disposed of at an appropriate offsite facility, the dry sediment will be solidified and additional testing for characterization will be completed. Dewatering of the sediment will be testing using a paint filter test (Method 9095B), 4-inch and 7-inch slump test, and moisture content testing. If the results of the analyses of the chemical parameters indicate that the dry sediment is not applicable for beneficial reuse onsite, the material may be solidified to meet the requirements for disposal at Waste Management. In additional to solidifying the material, analytical testing for sheer strength, hydraulic conductivity, and compressibility will be completed for landfill acceptance.

5.1.4 Post Dredging Sediment Sampling

The RAA will be dredged such that sediment is removed to bedrock. As mentioned above, bathymetry surveys (multi-beam and physical sounding) will be completed during and after dredging activities to confirm sediment removal. Once the dredging of a certain area is complete, the absence of sediment in each cell will be confirmed using a petite Ponar grab sample. If any of the three technologies utilized to confirm the absence of sediment in each cell indicate that residual sediment remains, additional dredging will be completed until all sediment has been recovered. A specification sheet for the petite Ponar grab sampler is attached as Attachment B.

If the sonar and/or probing indicates the presence of measurable sediments greater than two inches thick, a petite ponar sampler will be dropped to collect a sample of any loose material remaining on the river bed. The contents shall be visually inspected upon retrieval. Additional dredging shall be conducted if a fine-grained layer greater than two inches thick is observed and the confirmation process shall be repeated. If the sediment thickness is less than two inches or represents less than 25% of the sample volume, the dredging shall be deemed complete within that dredged unit area. If fine-grained material greater than two inches thick or representing more than 25% of the ponar volume is observed during a subsequent event, the fine-grained material shall be segregated by screening through a #40 sieve and submitted to the analytical laboratory for analyses of metals, polynuclear aromatic hydrocarbons (PAHs) and poly-chlorinated biphenyls (PCBs).

Analytical Methods, Containers, Preservations, and Holding Time Requirements for Sediment Sampling

Analytical Parameter	Analytical Method Number	Containers (number, type, size/volume)	Preservation Requirements (chemical, temperature, light protection)	Maximum Holding Times
Total Metals w/ Mercury, Zinc	SW-846 Method 6010/7470	(2) 4 oz glass jar	Chill with ice to 4°C	<180 days <28 days for Hg
PCB's	Method 8082	8 oz glass jar	Chill with ice to 4°C	14 days
PAH's	Method 8270	8 oz glass jar	Chill with ice to 4°C	40 days

5.1.5 Sand Blanket Sampling

Once sediment has been removed from the RAA, it is proposed that a 12-inch sand blanket be used to backfill the dredged area. Before sand is transported to the site from the local quarry, 3 samples of the material will be obtained and submitted to the laboratory to be analyzed for PAH's, PCBs, and the 8 RCRA metals to confirm that the material used for the sand blanket is not impacted with any of the chemicals of concern. The analytical results of these samples will be submitted to the WDNR upon receipt.

5.2 SURVEYS

Bathymetric surveys will be conducted before, during, and after remedial action activities. Prior to beginning the remedial action activities, a bathymetric survey will be completed to get a more representative volume of the sediment in the remedial action area. The surveys completed during and after

remedial activities will be utilized to confirm sediment volumes removed and to ensure that all sediment has been removed to bedrock.

During the project, a hydrographic survey will be performed on five (5) occasions during the project. Initially, a hydrographic survey will be completed over the entire RAA and will include sub-bottom profiling to determine sediment depths. Intermediate surveys will occur an estimated three (3) times and will covered the segments of the river where dredging operations have been completed. A final survey will cover the entire RAA to confirm that all sediment from the RAA has been removed to refusal (gravel).

To complete the hydrographic surveys, a Multi-Beam Echo Sounder (MBES) will be utilized. The MBES sends a sound wave into the water column which covers a wide swath of the riverbed. The time it takes for the waves to bounce back is used to determine the water depth. The MBES will have a track line spacing of approximately 10 feet to ensure adequate coverage and resolution given the anticipated water depths. A Sub-Bottom Profiler (SBP) will be used to map the sediment thickness. SBPs send acoustic pulses to the riverbed. Some of the sound energy is reflected back to the SBP by the surface sediments, some energy penetrates further into the substrate and is reflected back by different sediment or bedrock layers. The SBP can then use the reflected signals to accurately distinguish between and plot thicknesses of sediment layers.

Quality control measures will be set in place to cover the entire system including navigation sensors, data collection and processing equipment, and the operators. RTK GPS practices will be used to account for errors in GPS data collection. Echo sounders and Sub-Bottom Profilers will be checked under field conditions each time before data collection begins. If needed, a bar check will be conducted for further calibration. Once calibrated, a staff gage will be used to verify the depth measurement in a stationary position. Field notes will be documented regularly and any data gaps or errors will be recorded and accounted for accordingly to fill any identified gaps. Raw survey data will be conserved adequately before commencing with the processing of the data. All quality assurance measures are set in place to minimize the likelihood of errors that may affect the data in its final product. Site demobilization will not occur until field data has been post-processed and it is confirmed that all necessary data has been collected.

5.3 DECONTAMINATION PROCEDURES

Most sampling equipment in contact with environmental samples will be dedicated as single-use during this field work. Soil samples will be collected with plastic spoons into clean laboratory provided containers. All samples will be handled using clean, disposable nitrile gloves. Non-dedicated equipment, however, will be used to access some samples (shovel, pick axe, stainless steel mixing bowl for composite samples, Ponar grab sampler, etc.).

This non-dedicated equipment will be decontaminated prior to use in the field and also during sampling to reduce the potential for the introduction of contamination and cross-contamination. These procedures are necessary to ensure quality control in decontamination of field equipment.

Decontamination of all non-dedicated field sampling equipment will be conducted in a thorough and stepwise manner. New disposable nitrile gloves will be worn when handling clean sampling equipment to ensure that the equipment is not contaminated.

Prior to initial uses, all non-dedicated sampling equipment used for sample collection will be decontaminated according to the following procedure:

- Rinse thoroughly with potable water.
- Scrub with Alconox and water to remove any visible dirt.
- Rinse with potable water.

During storage and transport, sampling equipment shall be covered with plastic wrap or plastic bags to prevent contamination. Between sample locations, non-dedicated sampling equipment will be cleaned of dirt and dust particles using a stiff brush until no visible dirt remains attached.

5.4 INVESTIGATION DERIVED WASTE MANAGMENT

Debris (e.g., paper, plastic, acetate sleeves, polyethylene tubing, and personnel protective equipment) will be collected in plastic garbage bags or dumpsters and disposed of as non-hazardous waste. It is anticipated that debris will be transported to a local municipal landfill for disposal.

5.5 FIELD DATA AND NOTES

Field notebooks contain the documentary evidence for procedures as performed by field personnel. Hard cover, bound field notebooks will be used because of their compact size, durability and secure page binding. The pages of the notebook will be numbered consecutively and will not be removed.

Entries will be made in waterproof, indelible blue or black ink. No erasures will be allowed. If an incorrect entry is made, the information will be crossed out with a single strike mark and the change initialed and dated by the team member making the change.

Each entry will be dated. Entries will be legible and contain accurate and complete documentation of the individual or sampling team's activities or observations made. The level of detail will be sufficient to explain and reconstruct the activity conducted. Each entry will be signed by the person(s) making the entry.

The following types of information will be provided for each sampling task, as appropriate:

- Project name and number.
- Reasons for being on site or collecting samples.
- Date and time of activity.
- Sample identification number.
- Geographical location of the sampling point with reference to site (or other) facilities or a map coordinate system. Sketches will be made in the field logbook when appropriate.
- Physical location of the sampling point such as sediment pile, flow pipe, etc.
- Description of the method of sampling including procedures followed, equipment used, and any departure from the specified procedures. Description of the sample such as physical characteristics, odor, etc.
- Results of field measurements such as temperature, ORP, pH, etc.
- Readings obtained from health and safety equipment.
- Weather conditions at the time of sampling and previous meteorological events that may affect the representative nature of a sample.
- Photographic information including a brief description of what was photographed, the date and time, and the compass direction of the picture,
- Reference numbers from all serialized forms on which the sample is listed or labels which are attached to the sample, i.e., chain of custody forms, air bill numbers, etc.
- Other pertinent observations such as the presence of other persons on the site (those associated with the job or members of the press, special interest groups, or passersby), actions by others that may affect performance of site tasks, etc.
- Names of sampling personnel and signature of persons making entries.

5.6 INSTRUMENT CALIBRATION AND MAINTANENCE

On-site field calibration activities include the use of calibration standards and field equipment checks, as appropriate, for the equipment being used. Field calibration and/or field checking of each meter will be accomplished by following the procedures outlined in the operating manual for the instrument. At a

minimum, field calibration and/or field equipment checking will be performed both prior to and after equipment use. Field calibration will be documented in the field notebook.

Equipment that fails calibration or becomes inoperable during use will be removed from service and segregated to prevent inadvertent utilization. The equipment will be properly tagged to indicate that it is out of calibration. Such equipment will be repaired and recalibrated to approved standards by qualified personnel. Equipment that cannot be repaired will be replaced.

Results of activities performed using field equipment that has failed recalibration will be evaluated by the Project Manager or his/her designee. If the activity results are adversely affected, the results of the evaluation will be documented, appropriate personnel notified, and a decision made on the validity of the results.

Off-site calibration and maintenance of field instruments will be conducted as appropriate throughout the duration of project activities. All field instrumentation, sampling equipment, and accessories will be maintained in accordance with the manufacturer's recommendations and specifications and established field equipment practice. Off-site calibration and maintenance will be performed by qualified personnel. A logbook will be kept to document that established calibration and maintenance procedures have been followed. Documentation will include both scheduled maintenance and unscheduled maintenance.

SECTION 6 SAMPLE ANALYSIS AND LABORATORY DATA DELIVERABLE FORMAT

6.1 SAMPLE ANALYSIS RESULTS

The results of the analyses of the surface water, carriage water, dry sediment and any residual sediment samples will be utilized to monitor conditions to ensure that the proposed activities are protective of human health and the environment and that all water and sediment collected is characterized and handled in an appropriate manner.

6.1.1 Surface Water Action Levels

The turbidity in the surface water measured 100-feet upstream of the remedial action area will be compared to the turbidity in the surface water 100-feet to document that the dredging activities do not adversely impact the water quality of the Rock River. Turbidity at each location will be measure as Nephelometric Turbidity Unit (NTU). Conditions and response actions to for the turbidity monitoring are listed in the table below.

Condition	Downstream Monitor relative to Upstream Monitor (NTUs)	Response
Normal	< 20	• Collect readings prior to starting dredging, every 4 hours thereafter, and within 30 minutes of completing dredging for the day.
Elevated	20 - < 50	• Increase readings to every 2 hours.
Warning	50 - < 70	• Inspect pump and shroud. • Document pump location. • Document weather conditions, including precipitation records. • Increase downstream monitoring to continuous, except to check Upstream monitor every 30 minutes.
Stop Work	70 - < 80	• Stop dredging until readings reach Normal condition. • Notify DNR of Stop Work Condition, time, and turbidity readings.
Exceedance	> 80	• Stop dredging until readings reach Normal condition. • Notify DNR of Exceedance Condition, time, and turbidity readings.

6.1.2 Carriage Water Discharge Actions Levels

Carriage water that is proposed for discharge into the Rock River, following treatment using granular activated carbon, will be evaluated based on WDNR Water Quality-Based Effluent Limitations (WQBELs). Constituents that will be tested and sent to the lab include: Metals, PAH's, Phosphorous, and PCBs in the discharge. The results will be compared to the sampling criteria presented in the table below. Any exceedances of these criteria will be reported to the WNDR within 24-hours of being notified of the exceedance. The system is designed so that the carriage water may be discharged to the Janesville publicly owned treatment works (POTW), if necessary.

Carriage Water Sampling Criteria					
Parameter	Daily Maximum	Weekly Average	Monthly Average	Matrix	Method
Flow Rate					
Total suspended solids	10 mg/L			*Water*	SM2540D
Oil & Grease	15 mg/L			*Water*	SM5520B
Arsenic	680 ug/L			*Water*	EPA Method 6010
Lead	640 ug/L			*Water*	EPA Method 6010
Mercury			1.3 ng/L	*Water*	EPA Method 7470
Zinc	640 ug/L			*Water*	EPA Method 6010
Anthracene		0.34 ug/L		*Water*	EPA Method 8260B
Benzo(a)pyrene		0.39 ug/L		*Water*	EPA Method 8260B
Fluoranthene	3.2 ug/L			*Water*	EPA Method 8260B
Fluorene	58 ug/L			*Water*	EPA Method 8260B
Naphthalene	340 ug/L			*Water*	EPA Method 8260B
Phenanthrene	61 ug/L			*Water*	EPA Method 8260B
Pyrene	140 ug/L			*Water*	EPA Method 8260B
PCBs (total)			0.66 ng/L (non-detect)	*Water*	EPA Method 608
Phosphorus				*Water*	*SM4500P*
Additives				*Water*	

6.1.3 Dry Sediment Action Levels and Management

Per the sampling plan, the dry sediment will be sampled for those chemicals of concern that were previously identified in the sediment samples obtained from near the adjacent outfall. The results of the analyses of the dry sediment samples will be compared to the residual contaminant levels for industrial use. If concentrations are less than the industrial RCLs, soils will be stockpiled onsite for beneficial reuse (Wisconsin Admin Code 718.15). Once demolition of the former General Motors plant is complete and redevelopment plans are finalized, the on-site location where the stockpiled material will be reused can be determined. The stockpile area will be constructed with silt fences to prevent the transport of this material offsite.

If concentrations of the chemicals of potential concern exceed the industrial residual contaminant levels, the material will be solidified and additional samples of the material will be collected for characterization, including sheer strength, hydraulic conductivity, and compressibility, and to arrange appropriate off-site disposal.

6.1.4 Residual Sediment Action Levels

The scope of work for this remedial action area is to removed all sediment within the RAA to refusal. Therefore, sampling of sediment within the RAA post-dredging is not anticipated. Multi-beam surveys, physical sounding, and deploying a Ponar will be utilized to confirm the absence of sediment in each cell. Any residual sediment identified in the cells via these technologies will be removed by additional dredging.

6.2 CALIBRATION OF LABORATORY EQUIPMENT

The frequency and procedures for calibrating laboratory equipment are included in the Quality Assurance Manual for Pace Analytical Services. A copy of the Quality Assurance Manual cover and Table of Contents is included as Attachment A. The full QAM for Pace is available upon request.

6.3 SAMPLE CONTAINERS, PRESERVATIVES AND HOLD TIMES

The required sample containers, preservatives and maximum hold times for each analysis are included in the Quality Assurance Manual for Pace Analytical Services. A copy of the Quality Assurance Manual cover and Table of Contents is included as Attachment A. The full QAM for Pace is available upon request.

SECTION 7 SAMPLE QUALITY ASSURANCE

7.1 SAMPLING PROGRAM

The sampling program for this project, including sampling media, locations and frequency, is detailed in Section 5.

7.2 SAMPLING LABELING

Each sample collected will be assigned a unique identification number corresponding to sampling location and placed in an appropriate sample container. Each sample container will have a sample label affixed to the outside with the date, time of sample collection, and project name. In addition, this label will contain the sample identification number, analysis required, and chemical preservatives added, if any. All documentation will be completed in waterproof ink.

7.3 SAMPLE HANDLING

The analytical laboratory will provide pre-cleaned and preserved sample containers for this project. The laboratory will also prepare and supply the required field blank sample containers, reagent preservatives, and trip blank sample containers. Sample bottle containers will be placed into metal or plastic coolers and the coolers filled with ice in Ziploc® bags (or equivalent) to maintain a sample temperature of 4 degrees Celsius (ºC). These coolers will be received by the field sampling team within 24 hours of their preparation in the laboratory.

Samples collected in the field for laboratory analysis will be placed directly into the laboratory-supplied sample containers. Individual sample containers will be sealed by hand-tightening container lids.

Possession of samples collected in the field will be traceable from the time of collection until they are analyzed by an analytical laboratory or disposed. To maintain and document sample possession, chain of custody procedures as described in Section 6.6 will be followed. Samples will be packaged and shipped as described in Section 6.7.

Coolers containing field blanks and/or trip blanks received from the laboratory will be held on site for no longer than two calendar days. Coolers containing the sample containers and associated field and trip blanks will be received at the laboratory within 24 hours of their shipment from the field. The temperature in the coolers containing samples and associated field and trip blanks will be maintained at a temperature of 4ºC while on-site and during shipment.

7.4 SAMPLE PRESERVATIONS

Sample preservation measures will be used to minimize decomposition by degradation, biological transformation, chemical interactions, and other factors during the time between sample collection and analysis. Steps taken to maintain *in situ* characteristics may include refrigeration of samples at 4ºC, pH adjustment, and/or chemical fixation. Samples are preserved according to the requirements of the specific analytical method selected.

In general, samples will be collected using disposable sampling equipment. The analytical laboratory will prepare the sample containers with appropriate preservatives before shipment to the field.

7.5 SAMPLE BLANKS AND DUPLICATES

7.5.1 Trip and Field Blank Samples

No trip or field blank samples will be collected as part of this scope of work.

7.5.2 Duplicate Samples

Duplicate samples will be sent to the laboratory for analysis for quality assurance purposes. Duplicate samples will be collected and analyzed at a rate of no less than 5 percent per matrix.

7.5.3 Matrix Spike and Matrix Spike Duplicate Samples

Laboratory batch matrix spike (MS) and matrix spike duplicate (MSD) samples will be prepared and analyzed by the analytical laboratory. The laboratory may be supplied with triple sample volume in order to perform MS/MSD analysis. The limits are (whichever comes first):

- Each case of field samples, or
- Each 20 field samples within a case, or
- Each 14-calendar day period during which field samples in a case are received (said period beginning with the receipt of the first sample delivery group).

7.6 CHAIN OF CUSTODY PROCEDURES

A program has been established for sample chain of custody that will be followed during sample handling activities in both field and laboratory operations. The primary purpose of chain of custody procedures is to document the possession of the samples from collection through shipping, storage and analysis to data reporting and disposal.

Chain of custody refers to the actual possession of the samples. Samples are considered to be in custody if they are within sight of the individual responsible for their security or locked in a secure location. Each person who takes possession of the samples, except the shipping courier, is responsible for sample integrity and safe keeping.

Chain of custody procedures are provided below:

- Chain of custody will be initiated by the laboratory supplying the pre-cleaned and prepared sample containers. Chain of custody forms will accompany the sample containers.
- At the time of sample collection, the chain of custody form will be completed for the sample collected. The sample identification number, date and time of sample collection, analysis requested and other pertinent information (e.g., preservatives) will be recorded on the form. All entries will be made in waterproof, indelible blue or black ink.
- Field samplers will be responsible for the care and custody of the samples collected until the samples are transferred to another party, dispatched to the laboratory, or disposed. The sampling team leader will be responsible for enforcing chain of custody procedures during field work.
- When the form is full or when all samples have been collected that will fit in a single cooler, the sampling team leader will check the form for possible errors and sign the chain of custody form. Any necessary corrections will be made to the record with a single strike mark, dated, and initialed. Each cooler will be accompanied by a separate chain of custody form sealed in a Ziploc® bag (or equivalent) and placed on top of the samples or taped to the inside of the cooler lid.
- A shipping bill will be completed for each cooler and the shipping bill number recorded on the chain of custody form.

Samples will be packaged for shipment (see Section 6.7) and dispatched to the analytical laboratory with the appropriate chain of custody form. A copy of the chain of custody form will be retained by the sampling team for the project file and the original will be sent with the samples. Bills of lading will also be retained as part of the documentation for the chain of custody records.

When transferring custody of the samples, the individuals relinquishing and receiving custody of the samples will verify sample numbers and condition and will document the sample acquisition and transfer by signing and dating the chain of custody form. This process documents sample custody transfer from the sampler, usually through an express courier, to the analyst in the analytical laboratory.

Laboratory chain of custody will be maintained throughout the analytical processes as described in the laboratory's Quality Assurance Manual (see Attachment A). The analytical laboratory will return the original chain of custody in the analytical data deliverable package. The chain of custody form becomes the permanent record of sample handling and shipment.

7.7 SAMPLE SHIPMENT

Samples may contain elevated levels of concentrations of chemicals of concern and will be packaged and shipped as environmental samples in accordance with applicable federal and state regulations.

7.7.1 Packaging

Sample containers will be packed in Styrofoam® (or equivalent) or bubble wrap, to minimize breakage and placed in plastic coolers. Ice in Ziploc® bags (or equivalent) will be placed around sample containers. Additional cushioning material will be added to the cooler, if necessary. Paperwork will be put in a Ziploc® bag (or equivalent) and placed on top of the sample containers/blue ice or taped to the inside lid of the cooler. The cooler will be taped closed and signed custody seals will be affixed to two sides of the cooler. Laboratory address labels will be placed on top of the cooler.

7.7.2 Shipping

Standard procedures to be followed for shipping environmental samples to the analytical laboratory are outlined below.

- All environmental samples collected will be transported to the laboratory by field personnel, by laboratory personnel, by courier, or shipped through Federal Express or equivalent overnight service.
- Daily shipments will be sent whenever necessary to meet holding time requirements.
- The laboratory will be notified to be prepared to receive a shipment of samples. If the number, type, or date of shipment changes due to site constraints or program changes, the laboratory will be informed.

SECTION 8 QUALITY CONTROL PROCEDURES

Sample quality control consists of those activities specifically conducted to ensure that the quality assurance program described in this QAPP is implemented according to the specified requirements, to assess the effectiveness of the sample quality assurance program, to identify non-conformances, and to verify that any identified deficiencies are corrected. If any significant deviations from the quality assurance program are documented, corrective action measure(s) will be immediately implemented and documented.

For this project, sample quality control will consist of a field quality control audit (optional), data validation (optional), and technical review. Each of these activities is described below.

8.1 FIELD QUALITY CONTROL AUDIT

A field quality control audit may be conducted by a qualified field auditor during initial sampling activities. Should a field quality control audit be conducted, the field auditor would carefully review the field equipment selection and use to ensure that the equipment is capable of performing the desired functions. Equipment selection review would be based on the capabilities and limitations of the instrument/sampling device. Use would be reviewed based on observations and comparisons of actual versus expected results. In addition, the field auditor would meet with key field staff to review the field sampling program and evaluate the need for changes which may improve the results.

The field auditor would provide an oral report summarizing the results of the audit to the senior project manager within five working days of the audit. A written report documenting all activities associated with the field quality control audit would be provided to the senior project manager within ten working days after completion of the audit. The report would document audit findings, on-site meetings, and program revisions as necessary. If corrective action(s) should be required, the senior project manager or his/her designee will ensure that the appropriate corrective action(s) are implemented and will document that the corrective action(s) had been implemented through preparation of a corrective action report.

It is anticipated that the field quality control audit, if conducted, will be performed soon after field start-up to identify and rectify any potential problems early in the program. If changes to the approved quality assurance program are necessary following start-up of field activities and completion of the initial field quality control audit, additional field quality control audits may be conducted during subsequent sampling activities.

8.2 DATA VALIDATION

Laboratory analytical data may be subject to data validation to ensure laboratory compliance with quality assurance requirements of the selected analytical methods. In the event that suspect data are identified during the technical review specified in Section 7.3, additional data validation may be conducted.

8.3 TECHNICAL REVIEW

The reduction and analysis of data obtained during this project along with the conclusions/recommendations reached based on these data will be reviewed to ensure the quality of the data and the validity of the conclusions/recommendations.

To ensure accurate transfer of laboratory data, the accuracy of electronic copies (diskettes) of analytical data provided by the laboratory will be verified by manually checking a minimum of five percent of the sample data to the hard copy laboratory data package(s). Similarly, data that are reduced into tables and/or electronically re-formatted to facilitate data evaluation (e.g., data summary tables highlighting exceedances of cleanup standards) will be verified by manually checking a minimum of five percent of the sample data. If inaccuracies are detected, additional data will be checked and appropriate corrective actions taken.

Data analysis will be reviewed by qualified individuals other than those performing the analysis. Preliminary or informal analysis or calculations may be performed by one or more originators and need not be completely checked but may be reviewed by the senior project manager. Final calculations and summary data tables will be made on calculation sheets or spreadsheets, respectively that have signoff blocks for peer review documentation.

Conclusions and/or recommendations will be reviewed by one or more peers of the professional who develops the conclusion/recommendation to ensure their accuracy on the basis of the data that have been acquired and the analysis that has been conducted. Technical reviews will be performed by professionals who have the necessary knowledge and skill to perform the review and who are not directly involved in the activity being reviewed. Technical reviews will be documented and this documentation retained in the project file.

FIGURES

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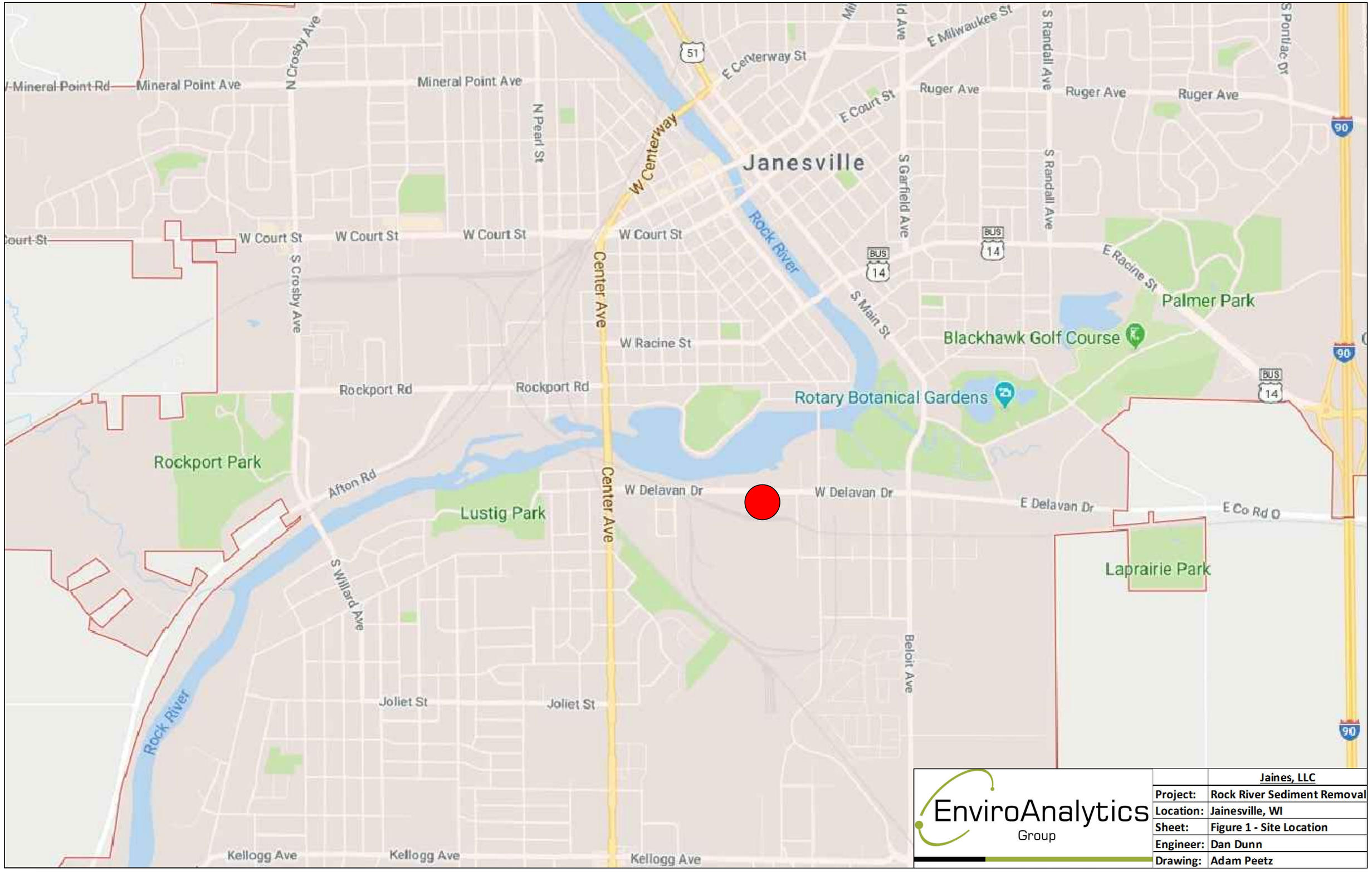
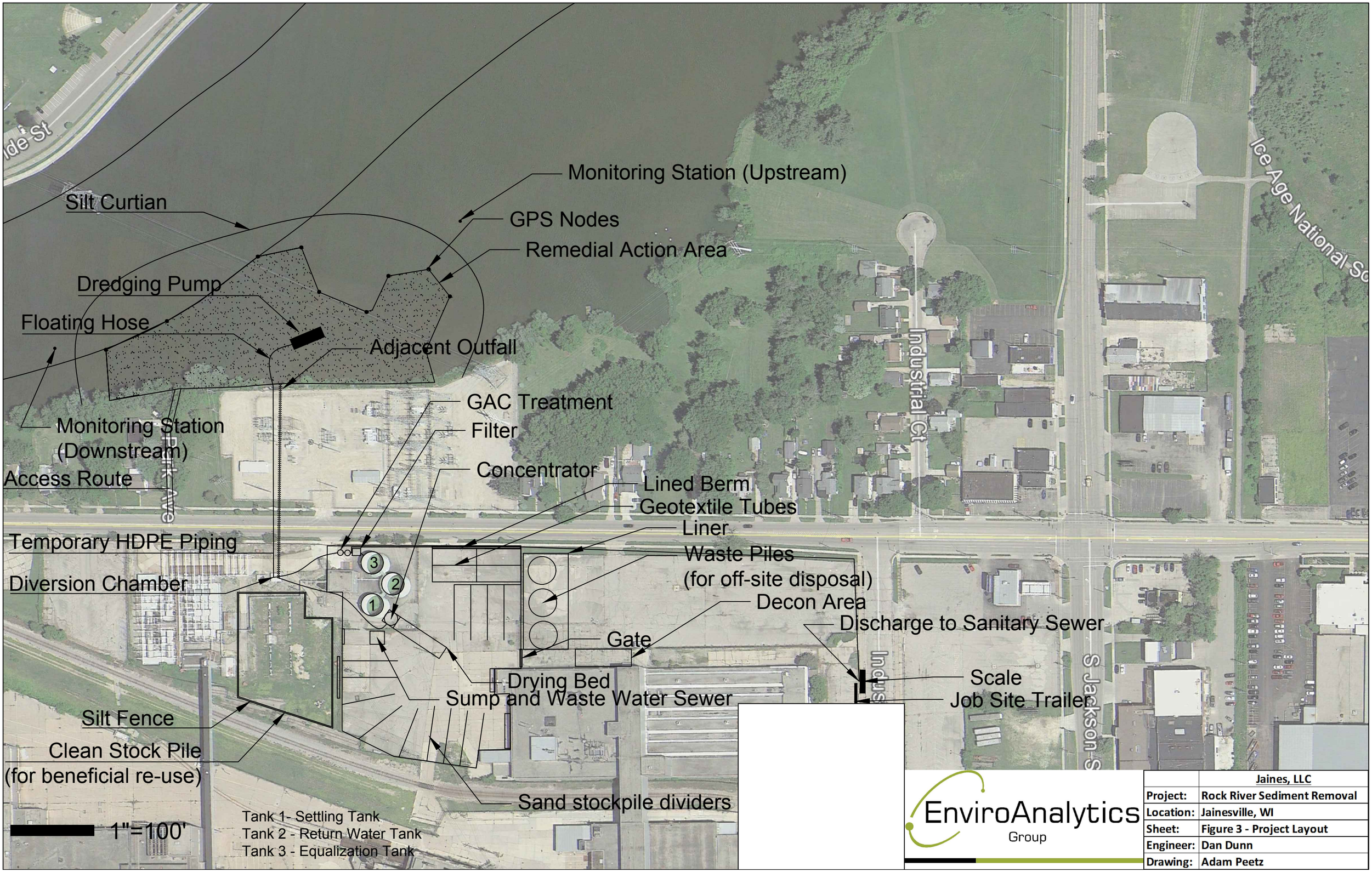


EnviroAnalytics Group

	Jaines, LLC
Project:	Rock River Sediment Removal
Location:	Jainesville, WI
Sheet:	Figure 1 - Site Location
Engineer:	Dan Dunn
Drawing:	Adam Peetz

EnviroAnalytics Group

	Jaines, LLC
Project:	Rock River Sediment Removal
Location:	Jainesville, WI
Sheet:	Figure 2 - Site Aerial
Engineer:	Dan Dunn
Drawing:	Adam Peetz



EnviroAnalytics Group

	Jaines, LLC
Project:	Rock River Sediment Removal
Location:	Jainesville, WI
Sheet:	Figure 3 - Project Layout
Engineer:	Dan Dunn
Drawing:	Adam Peetz

ATTACHMENTS

EnviroAnalytics Group

Environmental Engineers

ATTACHMENT A

PACE QUALITY ASSURANCE MANUAL COVER AND TABLE OF CONTENTS

EnviroAnalytics Group

Environmental Engineers

QUALITY ASSURANCE MANUAL

Quality Assurance/Quality Control Policies and Procedures

Pace Analytical Services, LLC – Green Bay WI
1241 Bellevue Street; Green Bay, WI, 54911; 920-469-2436

APPROVAL

Nils Melberg — 4/21/17
Nils Melberg
Laboratory General Manager
920-469-2436

Kate Verbeten — 4/21/17
Kate Verbeten
Laboratory Quality Manager
920-469-2436

Chad Rusch — 03/29/2017
Chad Rusch
Laboratory Technical Director
920-469-2436

Chris Haase — 4/26/17
Chris Haase
Laboratory Technical Director
920-469-2436

Scott Turner — 4/27/2017
Scott Turner
Laboratory Technical Director
920-469-2436

Table of Contents

ATTACHMENT B

PONAR GRAB SAMPLER SPECIFICATION SHEET

EnviroAnalytics Group

Environmental Engineers

Petite Ponar 6”X6” All SS.

- **Lighter by half than standard Ponar® Grab**
- **Designed for hand line operation**
- **Removable top screens**
- **Self-releasing pinch-pin™, heavy-duty hinges**
- **Extra weights available for more penetration**
- **Center pivot for low bottom disturbance**

This scaled-down sampler gives a whole new meaning to the word “petite.” We mean it can be easily carried by one person in one hand. You may still need good muscle mass, but, since it weighs under 25 pounds, you can use it on a line without the winch and crane recommended for the larger version. This dredge shares the same basic design as our standard Ponar® sampler with stainless-steel construction and cast scoops. Uses 3/16”+ line or 61-B14 cable. Available with or without case. Ship wt: 28 lbs with case.

Materials: 316 stainless steel

Fasteners, screen: 18-8 stainless steel

Weight & volume: 6.8 kg (24 lb) weight; 2.4 Liter volume

Total weight: 14 kg (28 lb)

Sample area: 152 x 152 mm (6 x 6”)

Ordering Information

Petite Ponar® Grab:

1728-G30	Petite, SS Scoops only
1728-G40	Petite, All Stainless Steel

Replacement Parts and Accessories:

1728-G36	Replacement screen, slide type, Pair
1726-G12	Weights, galvanized, pack 4, 2 lbs. each
1726-G52	Weights, stainless steel, pack 4, 2 lbs. each
1728-L12	Pinch-pin™ with chain and safety pin
910-G26	Plastic case with foam for Petite Ponar®.
190-E25	Washbucket, 500 µm mesh, for contents
61-B14	Cable, b” dia. stainless steel, 100’
62-C15	3/16” polyester line, 100’
66-C10	All-purpose winch
66-C52	Winch mount with clamp
66-A50	Hand reel for holding line

www.envcoglobal.com

94 Newton Road, Eden Terrace, Auckland 1010, New Zealand
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Phone: NZ 0800 623 336 or +64 (09) 307 3285 | Fax: +64 (09) 307 3287

ATTACHMENT C

EXO HANDHELD METER SPECIFICATION SHEET

EnviroAnalytics Group

Environmental Engineers

breaking the SONDE barrier

SPECIFICATIONS #E116

EXO Handheld Display

Enhanced interface for the EXO platform.

In water quality monitoring, instruments must hold up to harsh conditions. Rain or shine, sleet or snow, your equipment needs to keep up with you.

Introducing the new **EXO Handheld** from YSI, designed and engineered as a dedicated interface to EXO sondes. Log real-time data, calibrate sensors, set-up sondes for deployment, and transfer water quality data to a PC with this feature-packed device. Designed for reliable field use in challenging environmental conditions, this display features a waterproof IP-67, impact-resistant case and wet-mate connector.

Discover the benefits of the new EXO Handheld:

- Lighten the load for long trips into the field with an ergonomic device that feels at ease in your hand while sampling and profiling.
- Lower the learning curve of collecting high quality data with a simplified user interface and integrated help screens.
- Keep your sensors performing at their best with automatic calibration reminders based on your standard operating procedures.
- Build a georeferenced data set using GPS and site tagging functionality for up to 100 locations.
- Quickly transfer collected data sets and calibration records to a USB flash drive with the push of a button.
- Eliminate the need for alkaline batteries and sample for longer than ever with a powerful, rechargeable Li-Ion battery.

YSI.com/EXO-HH

Additional Features:

EXO Handheld Specifications

Size	**Instrument:** 8.3 cm width x 21.6 cm length x 5.6 cm depth (3.27 in x 8.5 in x 2.21 in)
Weight with Battery	567 grams (1.25 lbs)
Power	Rechargeable lithium-ion battery pack provides ~48 hours if powering the handheld only and ~20 hours if powering the handheld, sonde and four sensors; battery recharge time is ~9 hours with the AC power adapter. The instrument can also be powered via AC or external power pack though the USB port.
Operating Temperature	0 to 50 °C (32 to 122 °F)
Storage Temperature	0 to 45 °C (32 to 113 °F) with battery installed; 0 to 60 °C (32 to 140 °F) without battery installed ***Note:** Storing Li-Ion batteries in cool environments will help extend their lifespan.
Display	Color, LCD graphic display; 3.9 cm width x 6.5 cm height
USB Port	Built-In micro USB On-The-Go port for PC connection, recharging/powering the handheld and connecting directly to a USB stick.
Warranty	3-year handheld; 1-year Li-ion battery pack
Memory	> 100,000 data sets
Logging Modes	Single point or continuous logging with autostability option
Calibration Records	400 detailed calibration records can be stored and are available to view, download and print for traceability.
Languages	English, Spanish, Portuguese, French, German, Italian, Japanese, Norwegian, Simplified Chinese, and Traditional Chinese
Certifications	CEC, CE; RoHS; IP-67; WEEE; FCC; UN Part III, Section 38.3, Test methods for lithium-ion batteries (Class 9)
GPS	Built-in GPS; coordinates are stored with measurement data and site lists
Sites	Tag recorded data to site list of up to 100 locations.
Barometer	Built-in barometer with available user-calibration. **Range:** 375 to 825 mmHg; **Accuracy:** ±1.5 mmHg from 0 to 50 °C; **Resolution:** 0.1 mmHg; **Units:** mmHg, inHg, mbar, psi, kPa, atm

Ordering Information

599960	EXO Handheld Display – Enhanced interface for the EXO platform.

YSI a xylem brand

Who's Minding the Planet?®

YSI Inc.
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Yellow Springs, OH 45387

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info@ysi.com

Printed in the USA on recycled paper.

YSI.com/EXO-HH

ATTACHMENT D

METHOD 9095B PAINT FILTER LIQUIDS TEST

EnviroAnalytics Group

Environmental Engineers

METHOD 9095B

PAINT FILTER LIQUIDS TEST

1.0 SCOPE AND APPLICATION

1.1 This method is used to determine the presence of free liquids in a representative sample of waste.

1.2 The method is used to determine compliance with 40 CFR 264.314 and 265.314.

2.0 SUMMARY OF METHOD

2.1 A predetermined amount of material is placed in a paint filter. If any portion of the material passes through and drops from the filter within the 5-min test period, the material is deemed to contain free liquids.

3.0 INTERFERENCES

3.1 Filter media were observed to separate from the filter cone on exposure to alkaline materials. This development causes no problem if the sample is not disturbed.

3.2 Temperature can affect the test results if the test is performed below the freezing point of any liquid in the sample. Tests must be performed above the freezing point and can, but are not required to, exceed room temperature of 25 ºC.

4.0 APPARATUS AND MATERIALS

4.1 Conical paint filter -- Mesh number 60 +/- 5% (fine meshed size). Available at local paint stores such as Sherwin-Williams and Glidden.

4.2 Glass funnel -- If the paint filter, with the waste, cannot sustain its weight on the ring stand, then a fluted glass funnel or glass funnel with a mouth large enough to allow at least 1 in. of the filter mesh to protrude should be used to support the filter. The funnel should be fluted or have a large open mouth in order to support the paint filter yet not interfere with the movement, to the graduated cylinder, of the liquid that passes through the filter mesh.

4.3 Ring stand and ring, or tripod.

4.4 Graduated cylinder or beaker -- 100-mL.

5.0 REAGENTS

5.1 None.

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

A 100-mL or 100-g representative sample is required for the test. If it is not possible to obtain a sample of 100 mL or 100 g that is sufficiently representative of the waste, the analyst may use larger size samples in multiples of 100 mL or 100 g, i.e., 200, 300, 400 mL or g. However, when larger samples are used, analysts shall divide the sample into 100-mL or 100-g portions and test each portion separately. If any portion contains free liquids, the entire sample is considered to have free liquids. If the sample is measured volumetrically, then it should lack major air spaces or voids.

7.0 PROCEDURE

7.1 Assemble test apparatus as shown in Figure 1.

7.2 Place sample in the filter. A funnel may be used to provide support for the paint filter. If the sample is of such light bulk density that it overflows the filter, then the sides of the filter can be extended upward by taping filter paper to the inside of the filter and above the mesh. Settling the sample into the paint filter may be facilitated by lightly tapping the side of the filter as it is being filled.

7.3 In order to assure uniformity and standardization of the test, material such as sorbent pads or pillows which do not conform to the shape of the paint filter should be cut into small pieces and poured into the filter. Sample size reduction may be accomplished by cutting the sorbent material with scissors, shears, a knife, or other such device so as to preserve as much of the original integrity of the sorbent fabric as possible. Sorbents enclosed in a fabric should be mixed with the resultant fabric pieces. The particles to be tested should be reduced smaller than 1 cm (i.e., should be capable of passing through a 9.5 mm (0.375 inch) standard sieve). Grinding sorbent materials should be avoided as this may destroy the integrity of the sorbent and produce many "fine particles" which would normally not be present.

7.4 For brittle materials larger than 1 cm that do not conform to the filter, light crushing to reduce oversize particles is acceptable if it is not practical to cut the material. Materials such as clay, silica gel, and some polymers may fall into this category.

7.5 Allow sample to drain for 5 min into the graduated cylinder.

7.6 If any portion of the test material collects in the graduated cylinder in the 5-min period, then the material is deemed to contain free liquids for purposes of 40 CFR 264.314 and 265.314.

8.0 QUALITY CONTROL

8.1 Duplicate samples should be analyzed on a routine basis.

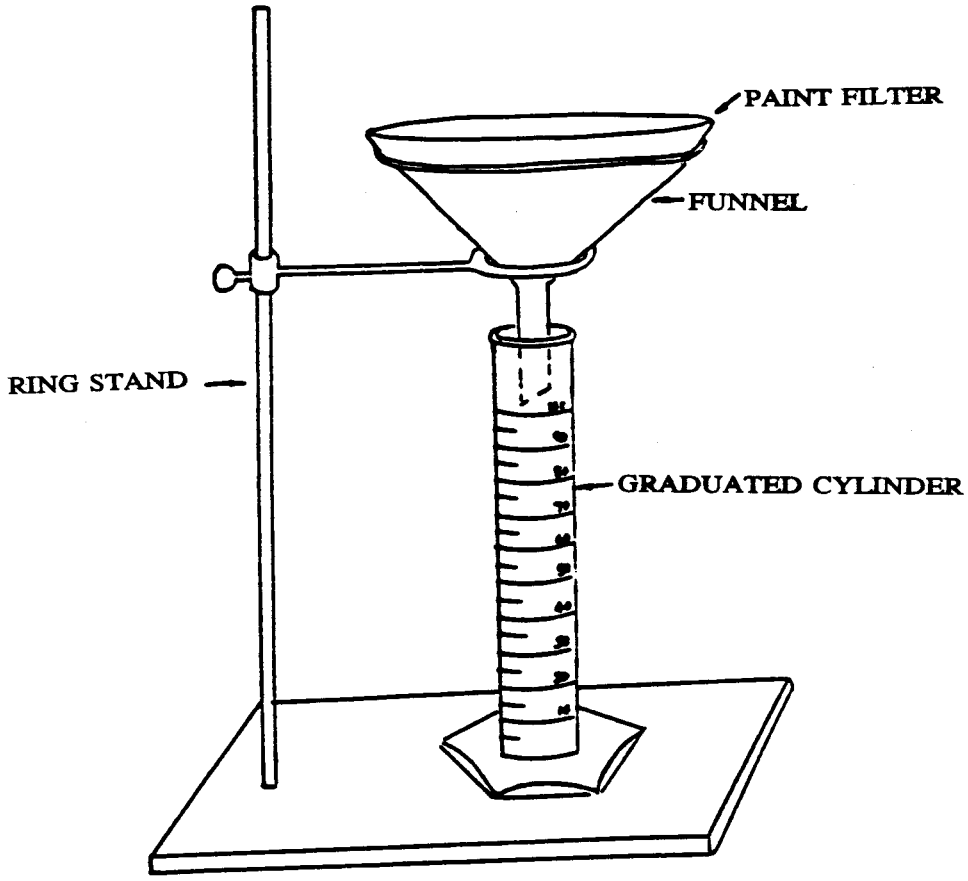
9.0 METHOD PERFORMANCE

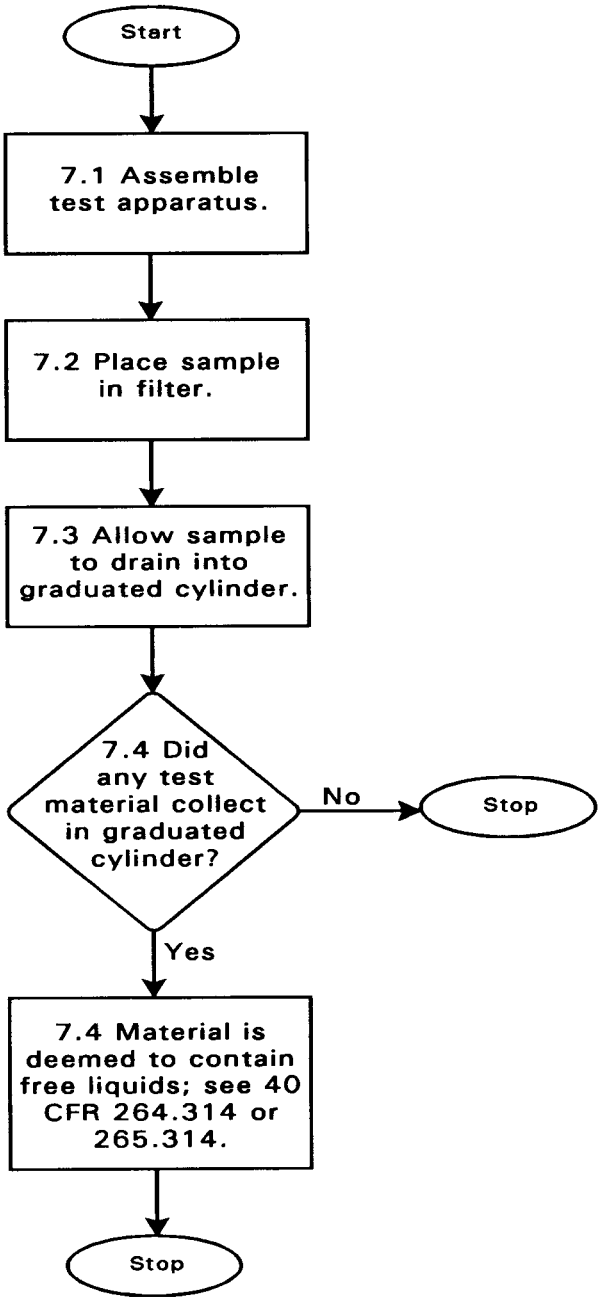
9.1 No data provided.

10.0 REFERENCES

10.1 None provided.

FIGURE 1
PAINT FILTER TEST APPARATUS




Start
7.1 Assemble test apparatus.
7.2 Place sample in filter.
7.3 Allow sample to drain into graduated cylinder.
7.4 Did any test material collect in graduated cylinder?
No
Stop
Yes
7.4 Material is deemed to contain free liquids; see 40 CFR 264.314 or 265.314.
Stop

ATTACHMENT E

ND D 4643 MICROWAVE METHOD OF DRYING SOILS

EnviroAnalytics Group

Environmental Engineers

ND D 4643 - MICROWAVE METHOD OF DRYING SOILS

Conduct this procedure according to ND D 4643.

Consult the current edition of ASTM for procedure in its entirety and equipment specification details.

SCOPE

This procedure is used to determine the total moisture content of a soil. The soil is dried to remove all free moisture. This test measures the weight of the moisture removed from the soil.

APPARATUS

Balance, readable to 0.1 g
Microwave safe dish
Glass rod, spatula or knife
Oven mitts
Heat sink
Microwave oven (It is preferable the microwave oven has a vented chamber, and a power rating of about 700 watts with variable power control.

PROCEDURE

Record all weights to the nearest 0.1 g. Weigh a clean and dry microwave safe dish and record the weight as tare weight.

Determine the sample size needed from the table below. Place the sample in the container and immediately weigh. Record this weight as wet weight.

Sieve Retaining Not More Than About 10% of Sample	Recommended Mass of Moist Specimen
No. 10 (2.0 mm)	100 to 200 g
No. 4 (4.75 mm)	300 to 500 g
3/4" (19 mm)	500 to 1000 g

Place the container in the microwave oven with a heat sink, set power to defrost setting, set timer for 3 minutes and start (See Notes). The 3-minute initial time is a minimum.

When the microwave oven stops, remove from the oven and weigh to the nearest 0.1 g and note. Use a small spatula, glass rod, or knife and carefully mix the soil. Take care not to lose any soil.

Return the container and soil to the oven and reheat for 1 minute. Remove, weigh, and again mix with spatula, glass rod, or knife. Repeat this process until a constant weight has been achieved. Use the final weight to calculate the moisture content. Record this weight as dry weight.

Discard sample after test.

CALCULATIONS

Calculate the percent moisture as follows:

$$A = [(B - C)/(C - D)] \times 100$$

A = Percent moisture
B = Mass of original (wet) sample, and container
C = Mass of dry sample, and container
D = Mass of container

REPORT

Report moisture to the nearest 0.1%.

NOTES

Initial power setting may be higher than defrost. The proper power setting can be determined only through the use of, and experience with a particular microwave.

Soils that are high in moisture and contain a large portion of clay take a longer time to dry. Initial heating time for this type of soil may be 12 minutes. Care should be taken to reduce cohesive samples to 1/4" particles to speed drying and prevent crusting or overheating of the surface while drying the interior.

Constant weight is defined as when further drying will cause less than 0.1% additional loss in mass when weighed at specified intervals. Specified weighing interval for microwave drying is one minute.

CALIBRATION

A calibration check of the equipment should be performed annually as a minimum, or whenever damage or repair occurs.

ATTACHMENT D Draft Carriage Water Discharge Permit

State of Wisconsin

CORRESPONDENCE/MEMORANDUM

DATE: May 7, 2018 FILE REF: 3200

TO: Susan Eichelkraut – Milwaukee

FROM: Nick Lent - Milwaukee

SUBJECT: Water Quality-Based Effluent Limitations (WQBELs) for the Jaines LLC's proposed discharge of carriage and or interstitial water to Rock River, using the WPDES General Permit, WI-0046558-05-0; *Carriage and/or Interstitial Water from Dredging Operations General Permit*

This is in response to your request for an evaluation of the need for water quality-based effluent limitations using Chapters NR 102, 104, 105, 106, and 207 of the Wisconsin Administrative Code (where applicable), for the potential surface water discharge of carriage/interstitial water from Jaines LLC proposed sediment removal project in the Rock River in the Rock River Basin in Rock County.

The following recommendations are made on a chemical specific basis for the discharge of carriage and interstitial water under the Carriage and/or Interstitial Water from Dredging Operations General Permit (existing WPDES Permit No WI-0046558-05-0):

Parameter	Daily Maximum	Weekly Average	Monthly Average	Footnotes
Flow Rate				1
Total suspended solids	10 mg/L			
Oil & Grease	15 mg/L			2
Arsenic	680 ug/L			3
Lead	640 ug/L			3
Mercury			1.3 ng/L	3
Zinc	640 ug/L			3
Anthracene		0.34 ug/L		3
Benzo(a)pyrene		0.39 ug/L		3
Fluoranthene	3.2 ug/L			3
Fluorene	58 ug/L			3
Naphthalene	340 ug/L			3
Phenanthrene	61 ug/L			3
Pyrene	140 ug/L			3
PCBs (total)			0.66 ng/L (no detect)	4
Phosphorus				5
Additives				6

Footnotes:

1. Monitoring only for flow rate. TSS and Oil and Grease limits are from the *Carriage and/or Interstitial Water from Dredging Operations General Permit*
2. This limit is only applicable if the first two samples are equal to or exceed 7.5 mg/L or if an oil sheen is visible from the discharge.
3. These are the calculated water quality based effluent limits. A start up sample is recommended for these pollutants. The general permit may be used for contaminated sediment that exceeds the threshold effect concentration (TEC) for sediment toxicity listed in the Department's guidance document, "*Consensus-Based Sediment Quality Guidelines*", but additional information must be provided to the Department. When

requesting coverage under the general permit, the applicant must demonstrate that contaminated sediment carriage and/or interstitial water can be treated to comply with effluent limits. This would usually require that a pilot treatability study be completed (a hanging bag test was completed in March 2018, however start-up effluent monitoring is still recommended for all the parameters listed here because the bag filter(s) may be subject to higher pressures and loading than the hanging bag tests). If the concentration exceeds 1/5th of the water quality-based effluent limit of the pollutant, (continued) monitoring for that parameter is required in the permit. If the concentration is less than 1/5th of the water quality based effluent limit, (continued) monitoring isn't required.

4. EPA Method 608 shall be used for wastewater analysis of the return discharge. See Part 2 of the attached memo for more information regarding these requirements.
5. The Rock River TMDL for total phosphorus and total suspended solids which has approved by EPA applies to this proposed discharge. For a general permit, there is a lumped allocation (see attachment #2) along with the following recommendation in the general permit language:

   Recommendations for Discharges to 303(d)-Listed Impaired Surface Waters; If a facility discharges a pollutant of concern to an 303(d)-listed impaired water body, the permittee is encouraged to minimize the pollutant discharge as part of an overall state effort to reduce the pollutant loading to the water body.
6. The water treatment additive "FLOPAM – EMF 240 CT PWG" may be used as described in the application submittal, however the use of any other water treatment additives, including those which may be added to the dredged material prior to or during treatment, are prohibited unless specifically approved in writing, by the Department.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Nick Lent at (414) 263-8623 or Nicholas.Lent@wisconsin.gov

It should be noted that the specified permit term for WPDES Permit No WI-0046558-05-0 has expired, and WPDES Permit No WI-0046558-06-0 was public noticed on April 30, 2018 with a proposed effective date of July 1, 2018. If dredging and discharge activities from this project occur when WPDES Permit No WI-0046558-06-0 becomes effective, the discharge would need to comply with the provisions of that general permit.

Attachments:

1. WQBEL memo – Jaines LLC; Rock River Dredge Project
2. Rock River TMDL General Permit Allocations for Reach 74 of the Rock River Bain; the Blackhawk Creek Watershed - LR 02
3. Site Maps – Project Area

PREPARED BY: Nick Lent – Water Resources Engineer, Effluent Limits Calculator

cc: Bill Fitzpatrick – Water Resources Engineer, RR/5
Trevor Moen – Wastewater Engineer, WY/3
Diane Figiel – Water Resources Engineer (WQBEL coordinator), WY/3

Attachment # 1

Water Quality-Based Effluent Limitations for Sediment Dredge / Removal: Jaines LLC

Prepared by: Nick Lent – May 2018

PART 1 – BACKGROUND INFORMATION

The Wisconsin Department of Natural Resources – "the Department" has identified an area of contaminated sediment in the Rock River adjacent to the former Janesville Assembly Plant in the City of Janesville ("the site"). Contaminants include polycyclic aromatic hydrocarbons (PAHs), metals, and semi-volatile organic compounds (SVOCs). The transport of these constituents to the Rock River occurred through a local storm sewer outfall draining the site and nearby areas. The Commercial Development Company (CDC) has recently purchased the site from General Motors LLC, and has assumed responsibility for cleaning the contaminated section of the Rock River. Jaines LLC is a limited liability company set up by CDC to acquire the former GM plant and its liabilities, and has applied for general permit coverage under the *Carriage and/or Interstitial Water from Dredging Operations General Permit.*

The sediment deposit is along the present shore of Rock River in an impoundment created by the Monterey Dam owned by the City of Janesville. The city is in the process of applying for a dam removal approval from the Department. The city plans to remove the dam in the next 1-2 years. The contaminated sediment dredging project is planned to be completed advance of the potential dam removal. Approximately 16,000 cubic yards of sediment will be hydraulically dredged from its present location and conveyed to a nearby treatment area. The treatment system will include grit removal, polymer addition, and geotextile filter tubes. Sediment will be stored on site and analyzed to determine final disposal methods. Some sediment may need to be landfilled, and others might be fit for reuse. Effluent from the treatment system will be discharged back to the Rock River, in accordance with the *Carriage and/or Interstitial Water from Dredging Operations General Permit.* If needed, there is a contingency for the use of the existing pretreatment wastewater treatment facility unit to ensure a sufficient level of treatment capacity and that there are no exceedances of the effluent limits. The remainder of this memo serves as a basis for any specific effluent limitations that may be needed to protect water quality standards, while permitting a discharge of carriage/interstitial water back to the Rock River.

General Permit Monitoring Requirements and Effluent Limitations: According to WPDES Permit No WI-0046558-05-0, the *Carriage and/or Interstitial Water from Dredging Operations General Permit,* discharges to surface water from dredging projects where sediment is contaminated shall be monitored according to the requirements for Sampling Point 004 in the general permit. The monitoring parameters consist of those substances at a concentration of concern, which are the substances in the sediment exceeding the threshold effects concentration (TEC), and or were identified in the elutriate test above 1/5th of the effluent limit. The potential effluent limits for all substances that have been identified as exceeding the TEC and have sufficient information to calculate criteria or secondary values per ch. NR 105, Wis. Adm. Code is provided in Part 2.

Discharge Information:

- Flow rate: 1.8 million gallons per day used in calculation. Based on materials submitted with the permit application, the estimated discharge flow rate is between 500 – 2500 gallons per minute, for approximately 12 hours per day, which would equate to 360,000 – 1,800,000 gallons per day.
- Source water: Carriage water from dredging operations near the site
- Fraction, "f", of discharge originating from receiving water: 1.0 (100 %)
- Expected dredge water hardness = 310 mg/L as $CaCO_3$, assumed equal to source water.
- Effluent characterization: It has determined been that the TEC value is exceeded for the list of pollutants included in Part 2 below from sediment sampling results of the proposed area to be dredged. This includes arsenic, lead, mercury, zinc, PAHs, and PCBs. Pursuant to the Carriage and/or Interstitial Water from Dredging Operations General Permit section 3.3.2, this qualifies the sediment as contaminated.
- Additives: The proposed treatment process includes addition of FLOPAM – EMF 240 CT PWG to facilitate solids removal. This additive is approved for use as described in application materials, however the use of any other water treatment additives, including those which may be added prior to or during treatment, are prohibited unless specifically approved in writing, by the Department.

Receiving Water Information:

- Name: Rock River
- Classification: Warmwater sport fish community, non-public water supply.
- Low Flow:
  $7\text{-}Q_{10}$ = 201 cfs (cubic feet per second);
  $7\text{-}Q_2$ = 430 cfs
  90-Q10 = 366 cfs
  Harmonic Mean Flow = 730 cfs

These flows represent the minimums expected for the Rock River near Janesville Wastewater Treatment Facility, which are expected to be extremely close or equal to the amount of flow expected at the site because the difference in drainage area from one to the other is negligible. The values were obtained from the U.S. Geological Survey based on flow information obtained at Station # 05430500, Rock River at Afton, Rock County. The stream flow was adjusted to account for the gauging station location being downstream of the Janesville Wastewater Treatment Facility.

- % of Flow used to calculate limits: 25 %
- Hardness = 310 mg/L as CaCO3, geometric mean of data from Rock River at Afton
- Source of background concentration data: Metals data from the Rock River at Waupun is used for consideration of the need for toxic effluent limits. This data is from the 'DNR Water Quality Rules Implementation Plan', Chapter 4, January 1998; Background of the Rock River at Waupun. The numerical values are listed below in the "MEAN BACK-GRD" columns of the tables in part 2.
- Multiple dischargers: there are multiple discharges to the Rock River, however none are within close enough proximity to this project that any primary mixing zones are expected to overlap.
- Impaired water status: the Rock River is listed as an impaired waterbody for sediment/TSS and total phosphorus. There is an approved TMDL for these impairments within the Rock River Basin, and most permit holders within the basin are in progress towards meeting the wasteload allocations.

Attachment # 1

PART 2 - WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN

The following tables list the calculated water quality-based effluent limitations for this discharge. All concentrations are expressed in term of micrograms per Liter (µg/L), except for the Hardness values (mg/L). Following the tables, permit recommendations are made where appropriate, based on a comparison between the effluent concentrations and the calculated limits pursuant to s. NR 106.04 and 106.05, Wis. Adm. Code.

Daily Maximum Limits based on Acute Toxicity Criteria (ATC):

RECEIVING WATER FLOW = 160.8 cfs (1-Q_{10} is estimated as 80% of the 7-Q_{10})

SUBSTANCE	REF. HARD. mg/L	ATC or Secondary Value	MEAN BACK-GRD.	MAX. EFFL. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic		339.8		679.60	135.92	
Lead	310	319.03	0.372	637.69	127.54	
Mercury (ng/L)		830	4.741	1655.26	331.05	
Zinc	310	323.77	1.9	645.64	129.13	
Fluoranthene		3.194		3.194	0.639	
Fluorene		58.1		58.100	11.620	
Naphthalene		344.260		344.260	68.85	
Phenanthrene		61.250		61.250	12.25	
Pyrene		140.000		140.000	28.00	

Weekly Average Limits based on Chronic Toxicity Criteria (CTC):

RECEIVING WATER FLOW = 50.25 cfs (¼ of the 7-Q_{10})

SUBSTANCE	REF. HARD. mg/L	CTC or Secondary Value	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic		152.2		2746.07	549.21	
Lead	310	83.56	0.372	1501.29	300.26	
Mercury (ng/L)		440	4.741	7857.92	1571.584	
Zinc	310	323.77	1.9	5809.25	1161.85	
Anthracene		0.019		0.343	0.069	
Benzo(a)pyrene		0.021		0.386	0.077	
Fluoranthene		0.914		16.491	3.298	
Fluorene		3.23		58.277	11.66	
Naphthalene		19.120		344.973	68.99	
Phenanthrene		3.403		61.399	12.28	
Pyrene		7.780		140.371	28.07	

Monthly Average Limits based on Wildlife Criteria (WC):

RECEIVING WATER FLOW = 91.38 cfs (¼ of the 90-Q_{10})

SUBSTANCE	WC or Secondary Value	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Mercury (ng/L)	1.30	4.74	1.3	0.26	
PCBs (ng/L)	0.120		3.937	0.787	

Monthly Average Limits based on Human Threshold Criteria (HTC):

RECEIVING WATER FLOW = 182.5 cfs (¼ of the Harmonic Mean)

SUBSTANCE	HTC or Secondary Value	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Lead	140	0.372	9149.9	1830.0	
Mercury (ng/L)	1.5	4.741	1.5	0.3	
Fluoranthene	4300		281768.8	56353.8	
Fluorene	193.6		12686.2	2537.2	
Naphthalene	1950		127778.9	25556	
Pyrene	126.2		8269.6	1653.9	

Monthly Average Limits based on Human Cancer Criteria (HCC):

RECEIVING WATER FLOW = 182.5 cfs (¼ of the Harmonic Mean)

SUBSTANCE	HCC or Secondary Value	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3		871.52	174.30	
Benzo(a)pyrene	0.0184		1.21	0.241	
PCBs (ng/L)	0.010		0.655	0.131	

Conclusions and Recommendations: *Representative* elutriate samples or the carriage/interstitial discharge itself would need to be below 1/5 of the effluent limit above, otherwise effluent limitations and monitoring would be required for the dewatering discharge. As noted on the cover page, project start-up effluent monitoring for total recoverable arsenic, lead, mercury, zinc, PAHs, and total PCBs is recommended to determine the potential risk of the carriage water exceeding these calculated limits.

General Note – for parameters with multiple calculated limits, determination of which limits apply from the tables above depends on the expected monitoring frequency. If only one sample were taken per week, the concentration would need to be equal to or less than the listed weekly average limit. This would mean that the weekly average concentration listed above is essentially the daily maximum limit. Furthermore, if only one sample were taken per month, the concentration would need to be equal to or less than the listed monthly average limit. Conversely, if more than one sample is taken during the week, then an average could be computed, which would have to comply with the weekly average. The limits presented on the cover page have been reviewed for redundancy. Weekly or monthly average limits which are higher than any of the daily maximums are omitted from the table of limits on the cover page.

Note for Polychlorinated biphenyls (PCBs); The monthly average limit based upon the Human Cancer Criteria in ch. NR 105, Wis. Adm. Code, is 0.66 ng/L. This value is well below the currently achievable levels of detection and quantification at certified laboratories. In this case, s. NR 106.07(6), Wis. Adm. Code, states that;

(a) the permittee shall perform monitoring required in the permit using an acceptable analytical methodology for that substance in the effluent which produces the lowest limit of detection and quantification.

(b) the permittee shall determine the limit of detection and limit of quantification using a method approved by the department.

(c) Compliance with the concentration limit shall be determined as follows:

(1) When the water quality based effluent limit is less than the limit of detection, effluent levels less than the limit of detection are in compliance with the effluent limitation.

(2) When the water quality based effluent limit is less than the limit of detection, effluent levels greater than the limit of detection, but less than the limit of quantification are in compliance with the effluent limitation except when analytically confirmed and statistically confirmed by a sufficient number of analyses of multiple samples and use of appropriate statistical techniques.

PART 3 – TOTAL SUSPENDED SOLIDS

Effluent total suspended solids (TSS) limits are needed to protect the receiving water from objectionable deposits on shores and stream beds.

Because PCBs have been detected in the project sediment above a level of concern, it is the Department's policy to set more restrictive TSS effluent limitations as a control to manage risk of particle-bound transport. Therefore, a daily maximum TSS limits equal to 10 mg/L as a daily maximum is recommended. These concentrations reflect the removal efficiency of the solids segregation process, and are equal to similar projects completed in the recent past elsewhere in Wisconsin.

Note- there is no mention of a 10 mg/L daily maximum limit in the current WPDES Permit No WI-0046558-05-0 general permit, however the daily maximum limit of 10 mg/L is included in the public noticed WPDES Permit No WI-0046558-06-0, and compliance with this limit and the updated general permit would be needed. WI-0046558-06-0 is proposed to be effective July 1, 2018.

PART 4 – TOTAL PHOSPHORUS

Technology Based Limits

Chapter NR 217, Wis. Adm. Code, specifies that an effluent phosphorus limitation of 1.0 mg/L or an approved alternative limit is applicable to industrial dischargers of $\geq$ 60 lbs of total phosphorus per month. Lacking a correlation between the sediment phosphorus concentration and the potential phosphorus concentration of dredging effluent, it cannot be determined if a concentration based limit of 1.0 mg/L would apply, or if it would serve any purpose (i.e. require treatment). **No technology based limit for total phosphorus is recommended at this time**.

Water Quality-Based Phosphorus Limits:
Revisions to administrative rules regulating phosphorus took effect on December 1, 2010. These rule revisions include additions to ch. NR 102 (s. NR 102.05), Wis. Adm. Code, which establish phosphorus standards for surface waters. Revisions to ch. NR 217 (Ch. NR 217, Subchapter III), Wis. Adm. Code, establish procedures for determining water quality based effluent limits for phosphorus, based on the applicable standards in ch. NR 102, Wis. Adm. Code. For the Rock River, the total phosphorus water quality criteria is 0.100 mg/L. The background concentration of total phosphorus in the Rock River exceeds this criterion, therefore, the calculated water quality based effluent limit according to s. NR 217.13, Wis. Adm. Code, is set equal to the criteria.

Although there is no estimate of the effluent phosphorus concentration at this time, this project is not expected to pose a threat to total phosphorus water quality. There is no basis to recommend effluent limits for total phosphorus at this time. Estimates indicate that this cleanup project will remove up to 16,000 cubic yards of sediment from the project area, which likely includes deposited phosphorus. A turbidity barrier will be established and maintained throughout the entire project, which will help ensure that sediment and associated particle-bound phosphorus is not released to the Rock River. Therefore, it is believed that the general scope of this project will help improve or maintain water quality by allowing for future sedimentation and phosphorus retention.

Impairment/ TMDL status
A total maximum daily load has been developed for the Rock River, and approved by US EPA. The TMDL includes Wasteload Allocations for total phosphorus and total suspended solids which are meant to reduce these loadings to impaired reaches of the Rock River and its tributaries. The Rock River TMDL includes wasteload allocations for discharges from general permits, so discharges from this and other activities have been accounted for in the model.

Conclusion
There does not appear to be any basis to recommend effluent limits for total phosphorus at this time. The permit application has stated that this dredging project may remove up to 16,000 cubic yards of sediment from the project area, which likely contains some legacy phosphorus.

PART 4 – OTHER RELEVANT INFORMATION AND REQUIREMENTS OF THE CARRIAGE AND/OR INTERSTITIAL WATER FROM DREDGING OPERATIONS GENERAL PERMIT (Existing WPDES Permit No WI-0046558-05-0)

For informational purposes, the following text is taken directly from section 3, "**Discharge Requirements**," of the Carriage and/or Interstitial Water from Dredging Operations General Permit, which can be viewed here: http://dnr.wi.gov/topic/wastewater/documents/46558_fs.pdf

3.3 Surface Water Discharge Requirements
A discharge to surface water includes ditches, storm sewers and pipes that convey wastewater to creeks, streams, rivers and lakes. Depending on whether the sediment quality characterization is "uncontaminated" or "contaminated", one of the two monitoring requirements and limitations tables applies - 3.3.1 for "uncontaminated" sediment or 3.3.2 "contaminated" sediment. Information on sediment quality is collected during the ch. 30 dredging permit application process, as required under ch.

NR 347, Wis. Adm. Code. The "*Consensus-Based Sediment Quality Guidelines*" is used to evaluate sediment quality.

3.3.1 Uncontaminated Sediment

For sediment that qualifies as "uncontaminated", the only monitoring is for flow and total suspended solids. A total suspended solids effluent limit of 80 mg/L applies, which is based on the ability of simple settling equipment to easily remove suspended solids. This limit was the result of a hearing examiner's decision on a Mississippi River dredging case, which decided 80 mg/L is the appropriate limit for gravity sedimentation treatment technology for sediments consisting of primarily sand and some silt. The first issuance of this general permit in 1982 included the 80 mg/L limit, and it has been used in subsequent reissuances.

3.3.2 Contaminated Sediment

When the sediment is characterized as "contaminated", additional monitoring may be required depending on the contaminants found in the sediment or elutriate test, and if they're at a concentration of concern. The "*Consensus-Based Sediment Quality Guidelines*" is used to make this determination using the threshold effect concentration (TEC) as the criteria for determining if the sediment is considered contaminated for the purpose of this general permit. The initial determination is any contaminant parameter that exceeds the TEC is monitored and limited in the permit. If natural background concentrations exceed the TEC, the background concentrations may be used instead of the TEC (refer to paragraph 7.2 in the "*Guidance for Applying the Sediment Sampling and Analysis Requirements of ch. NR 347, Wis. Adm. Code*", and Appendix B of the CBSQG).

When a TEC is exceeded for a parameter, it's recommended that an elutriate test be conducted as a second optional determination of whether the contaminant is present in the wastewater at a concentration of concern. If the elutriate concentration exceeds 1/5 the water quality based effluent limit of the contaminant parameter, monitoring is required in the permit. If the concentration is less than 1/5 the water quality-based effluent limit, monitoring isn't required.

If data indicates sediment or elutriate concentrations may be at a level of concern, the Department would calculate site specific water quality-based effluent limits in accordance with chs. NR 105 and 106, Wis. Adm. Code (the limits can't be taken directly from a table like groundwater PALs and ESs). Because the procedures for determining the need for a limit and the method to calculate a limit are specified in the permit, the Department may incorporate the limits in the general permit with the cover letter that grants permit coverage.

For contaminated sediment all discharges are subject to a 40 mg/L total suspended solids limit that is based on best professional judgment. Greater sediment removal is needed to prevent contaminants from being discharged, compared to the less stringent 80 mg/L limit that applies to uncontaminated sediment. Contaminants are usually associated with the suspended solids. Controlling suspended solids is also a good indicator for the removal of other contaminants.

3.3.3 Sample Frequency

Flow volume must be monitored every day, and total suspended solids must be monitored at least once per week for the duration of the project as a key indicator of effluent quality. For any other monitoring

parameters, the frequency is twice a week the first week, and then weekly during the next four weeks of discharge to confirm effluent quality to assure the contaminants are below limits. The Department may require daily sampling during the start-up of a treatment system to monitor treatment performance, or if an effluent limit exceedance occurs. If the discharge is in substantial compliance with effluent limits (always below limits), the monitoring frequency may be reduced from weekly to monthly, but it must resume to weekly if there is an exceedance. The permittee may make this change in monitoring frequency without concurrence from the Department.

3.3.7 Solids Removal

Over time, settling equipment fills up with settled solids, resulting in decreased volume and residence time for wastewater and ultimately, ineffective solids treatment. Solids must be removed upon occasion to insure effective settling occurs and that permit limits are met. For some short-term operations, solids may not need to be removed to maintain the hydraulic and absorptive capacities of the treatment system.

3.3.8 Impaired Waters on 303(d) List and TMDLs

If a facility discharges a pollutant of concern to an 303(d)-listed impaired water body, the pollutant discharge needs to be minimized as much as possible as part of an overall state effort to reduce the pollutant loading to the water body. The 303(d) list of Wisconsin impaired water bodies may be identified by contacting the Department or by searching for the 303(d) list on the Department's internet site referenced in the permit. For a dredging operation the most common pollutant of concern may be a total suspended solids (TSS) discharge to a sediment impaired water body.

The permit requires that an annual check be conducted, by February 15th each calendar year, to determine whether the permittee discharges process wastewater to a 303(d)-listed impaired water body. If so, the permittee shall evaluate, within 180 days of the annual check, whether additional control measures and practices could be used to voluntarily minimize, with the goal of elimination, the discharge of pollutants of concern that contribute to the impairment of the water body. The permittee should keep a record of the amount of pollutant discharge reduction that has been voluntarily achieved. The exact amount of pollutant reduction will be legally established in the State and Federal approved Total Daily Maximum Load (TMDL) allocation established for the discharge.

Federal Statutes, 40 CFR 122.4, prohibit the issuance of a WPDES permit to a new source or new discharger that will contribute to a violation of a water quality standard in a 303(d)-listed water. Also, an increased discharge of a pollutant of concern that would cause or contribute to a violation of a water quality standard in a 303(d)-listed water is not allowed. Therefore, this general permit specifies that a permittee may not discharge a new pollutant of concern to a 303(d)-listed impaired water body or significantly increase the discharge of a pollutant of concern to an impaired water body unless the new or increased discharge does not contribute to the receiving water impairment, or the new discharge is consistent with an approved TMDL allocation for the impaired water body. The general permit may not be used if this requirement is not met for a new discharge.

For a new dredging operation requesting coverage under this general permit, the Department will evaluate the proposed new pollutant discharge amount and receiving water to determine if the above requirement can be met. A variety of options may be available to insure any proposed new discharge does not contribute to the receiving water impairment such as on-site capture of the pollutant of concern, an

alternate discharge location, wastewater reuse opportunities, directing the discharge to a seepage area, or enhanced treatment options so the discharge would meet the water quality standard.
Permit applicants should refer to the following two Department web sites for information on the 303(d) list and TMDLs:

http://dnr.wi.gov/org/water/wm/wqs/303d
http://dnr.wi.gov/org/water/wm/wqs/303d/Approved_TMDLs.html

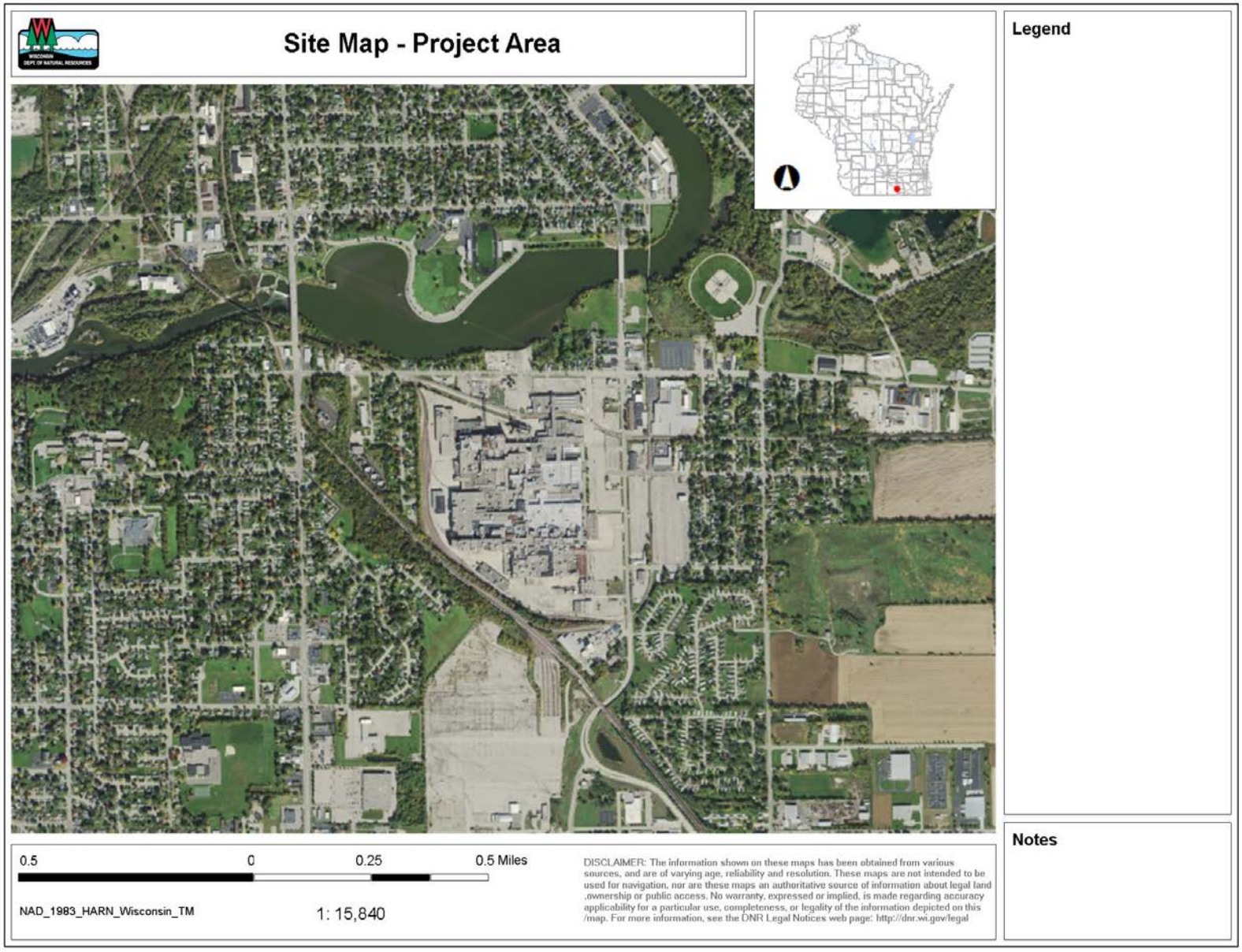
Attachment # 2

A review of the Rock River TMDL (pages 109 and 126) shows there is a wasteload allocation for general permit sources for TSS and for phosphorus as provided in the table below. It is believed that the overall scope of this project, including the resulting discharge back into the Rock River, will meet the intent of the TMDL. As stated on the cover page, and for similar discharges that have been permitted since approval of the Rock River TMDL, the permittee is encouraged to minimize the pollutant discharge as part of an overall state effort to reduce the pollutant loading to the water body.

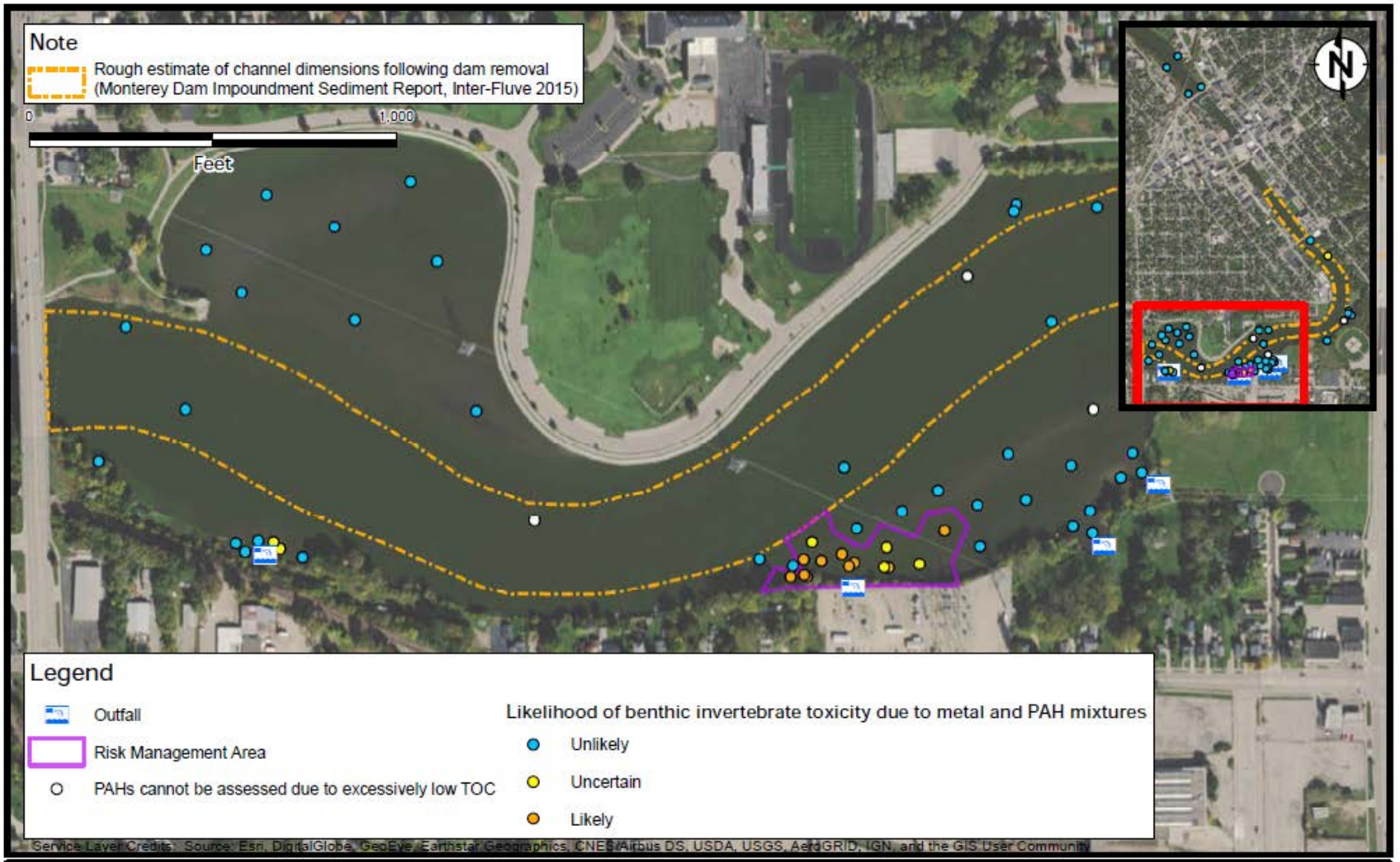
Reach Waterbody Name and Extents	Allocation Component	Daily TP Load (lbs/day)												Annual Load Allocation (lbs/year)
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
74	Total Loading Capacity	7.58	9.11	10.82	14.02	14.90	13.50	8.68	5.74	4.05	4.54	5.68	6.55	3195.69
Rock River	Load Allocation	2.39	2.87	4.45	5.85	6.62	4.89	2.32	1.00	0.65	1.12	1.78	2.05	1093.91
Mile 183 to Blackhawk Creek	Background	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Ag/Non-Permitted Urban	2.39	2.87	4.45	5.85	6.62	4.89	2.32	1.00	0.65	1.12	1.78	2.05	1093.91
	Wasteload Allocation	5.19	6.24	6.37	8.17	8.28	8.61	6.36	4.74	3.40	3.42	3.90	4.50	2101.78
	General Permit Sources	0.02	0.08	0.07	0.08	0.05	0.09	0.10	0.10	0.06	0.04	0.02	0.02	22.14
	MS4	5.17	6.16	6.30	8.09	8.23	8.52	6.26	4.64	3.34	3.38	3.88	4.48	2079.64
	WWTF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Reach Waterbody Name and Extents	Allocation Component	Daily TSS Load (tons/day)												Annual Load Allocation (tons/year)
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
74	Total Loading Capacity	1.20	1.57	1.63	2.01	2.15	1.83	1.03	0.63	0.47	0.62	0.85	1.11	422.18
Rock River	Load Allocation	0.56	0.72	0.85	1.02	1.13	0.77	0.29	0.12	0.10	0.18	0.33	0.48	198.67
Mile 183 to Blackhawk Creek	Background	0.05	0.06	0.06	0.06	0.05	0.04	0.01	0.02	0.03	0.04	0.04	0.03	14.84
	Ag/Non-Permitted Urban	0.51	0.66	0.79	0.96	1.08	0.73	0.28	0.10	0.07	0.14	0.29	0.45	183.83
	Wasteload Allocation	0.64	0.85	0.78	0.99	1.02	1.06	0.74	0.51	0.37	0.44	0.52	0.63	223.51
	General Permit Sources	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	2.11
	MS4	0.46	0.64	0.59	0.80	0.84	0.87	0.57	0.37	0.24	0.27	0.34	0.45	195.47
	WWTF	0.18	0.20	0.18	0.18	0.18	0.18	0.16	0.13	0.12	0.17	0.18	0.18	25.93

Attachment # 3



Attachment # 3



RAMBOLL ENVIRON

DRAFTED BY: RD | DATE: 4/25/2017

Spatial Distribution of Metal-PAH Mixtures and Toxicity Predictions for Surface Sediments

Rock River (RM 178.5 to 180.5), Janesville, Wisconsin

FIGURE 5.11

PROJECT: 0227748A

ATTACHMENT E Revised Engineering Design Report (for GP WI-0046558-05-0)

REVISED

ENGINEERING DESIGN REPORT

ROCK RIVER SEDIMENT REMOVAL PROJECT

FORMER GM ASSEMBLY PLANT

JANESVILLE, WISCONSIN

Prepared For: Michael Roberts
Jaines, LLC

Prepared By:

EnviroAnalytics Group

1650 DesPeres Rd. Ste. 303
St. Louis, MO 63131

May 2018

Project description;

The Former General Motors (GM) Assembly Plant (the Site) located in Janesville (Rock County), Wisconsin has been assigned WDNR Bureau for Remediation and Redevelopment Tracking System (BRRTS) Number (#) 02-54-577951. A Site Location Map and a Site Plan Aerial are provided as **Figures 1 and 2**. The Site contains sediments impacted by contaminants of potential ecological concern (COPECs), including polycyclic aromatic hydrocarbons (PAHs), lead, mercury, and polychlorinated biphenyls (PCBs), that were identified near the Adjacent Outfall where storm water from the former GM plant discharged to the Rock River north of the substation along Delavan Drive in Janesville. Information regarding the sedimentation in this reach of the Rock River was initially reported in studies completed for the City as part of the Monterey Dam demolition planning (Inter-Fluve, Inc., 2015). Multiple site investigations and evaluations were subsequently conducted by GM as documented in the *Sediment Investigation* R*eport* (GHD Report No. 21, May 2016), the *Rock River Site Investigation Report* (GHD Report No. 30, May 2017), and the *Remedial Action Options Report* (GHD Report No. 32, May 2017). Multiple lines of evidence from comprehensive studies of sediment quality impacts on local biological receptors were evaluated utilizing statistical methods and consensus-based guidance to assess potential ecological and human health exposure risks.

This Engineering Design Report (RADR) presents the project plans for removal of approximately 15,000 to 20,000 cubic yards (cys) of impacted sediment from a designated Remedial Action Area (RAA) shown on **Figure 3**. The project layout depicted on **Figure 3** proposes hydraulically dredging the impacted sediment using a shrouded Toyo 150B dredge pump and conveyance of the sediment / river water slurry to the former GM plant for dewatering and treatment. The slurry will be conveyed through a floating hose to temporary piping installed through the box culvert at the outfall leading back to the diversion chamber located south of Delevan Drive at the former GM Site. The granular solids within the slurry will be removed by settling in a concentrator tank and across a drying bed. The fluids containing fine-grained particles (concentrator supernatant) will be pumped into the large steel tank (#1) for additional solids removal by settling that may include polymerization. The water fraction will be pumped into the return water tank (#2). A fraction of the settled solids containing fine particles and organic matter will be filtered through geotextile tubes, with the ellutriant captured and recirculated to the settling tank. Water from Tank #2 will be returned to the dredge pump head as make up water for dredging activities. Excess water will drain by gravity via an overflow pipe into the equalization tank (#3) for additional filtering through geotextile filters. The effluent will be sampled and discharged to either the local sanitary sewer system for additional treatment, or through granular activated carbon (GAC) prior to discharge into the River. Once dewatered, dried sediments will be characterized for proper re-use onsite or final disposal offsite, in accordance with the Sampling and Analyses Plan. Previous analytical results from sediment and porewater samples indicate the dried sediments may provide beneficial re-use as fill materials during redevelopment of the Site. A stockpile will be created south of the diversion chamber and best management practices (i.e., silt fence) will be utilized for storm water runoff protection in accordance with local and State law.

The sediment removal project is anticipated to be completed “in the wet”, including a final bathymetric survey, confirmation sampling, if any, to verify achievement of project objectives, and placement of a sand blanket over the completed sediment removal area to re-establish habitat. The project is

anticipated to begin mid-summer of 2018 and dredging operations should be completed within approximately 3 to 4 months from the date of start. All project documentation will be compiled and submitted to the DNR within 60 days of completion along with a request for site closure.

All work will be conducted in accordance with permits from the Wisconsin Department of Natural Resources (WDNR), the Army Corps of Engineers (ACOE), and in coordination with the City of Janesville. A pre-application meeting (docket # INF-SC-2018-54-00686) was held with the WDNR and City of Janesville at the WDNR office in Janesville on March 1, 2018 to review the conceptual approach, determine draft remedial action design components for this report, review permit application requirements, and coordinate project timelines for approval and implementation.

Project need/purpose;

The project objectives and remediation goals (RGs) as outlined herein, are to mitigate potential threats (associated with sediment impacted by site-related COPECs) to the benthic invertebrate community in the vicinity of a storm water outfall to the Rock River, minimize the potential for sediment transport downstream, and assure the remedial activities do not further degrade this impaired waterway.

The project does not impact wetlands as none are located within the project area. Furthermore, reviews have been conducted that indicate no impacted on threatened or endangered species nor historical sites. The project plans for removal of contaminated sediments from the vicinity of the outfall will minimize impacts to public waters.

Characterization and discussion of the waste to be treated;

Sampling and analyses of sediments near the Adjacent Outfall identified contaminants of potential ecological concern, including polycyclic aromatic hydrocarbons (PAHs), lead, mercury, and polychlorinated biphenyls (PCBs). Multiple site investigations and remedial evaluations were documented in the *Sediment Investigation* R*eport* (GHD Report No. 21, May 2016), the *Rock River Site Investigation Report* (GHD Report No. 30, May 2017), and the *Remedial Action Options Report* (GHD Report No. 32, May 2017).

A field treatability study included collection of additional sediments at six locations within the RAA. The sediments were homogenized using a paddle mixer in 5-gallon buckets and poured through “hanging bag” samples of geotextile. The ellutraint was collected and analyzed for COPECs. A separate sample was sent to Infrastructure Alternatives Inc (IAI) for a polymerization study. Once the chemical dosing for selected polymer was determined, the treated sediment was run through a second “hanging bag” test and an ellutraint sample send for laboratory analyses. The two studies indicated that polymerization aids settling of the solids and thereby removal the COPECS from the carriage water. Additional, more traditional, solids removal by settling systems have been incorporated into the design to assure compliance with strict effluent limitations presented in DNR’s draft permit conditions.
See Attachment 3.

The dried solids will be further characterized to ascertain the best management practice. Preliminarily, it appears, based upon the sediment and porewater analyses, that sediments can be beneficially re-used as fill material during redevelopment of the site for non-residential land use. Waste Management has two landfills available to accept the dried solids and provided acceptance criteria, as a contingency measure if off-site disposal is necessary.

Waste loadings;

The sediment slurry may containing solids ranging from 10 to 35% solids and will be pumped at flowrates up to 2,500 gallons per minute (gpm). Geotextile tubes have a capacity of between 400 to 500 cubic yards of dried sediment. Carriage water/ellutraint draining from the dewatering process, including the geotextile tubes will be recirculated through the treatment system. A portion of the treated liquids will be discharged to the Rock River via Tank #3 leading to the diversion chamber and the box culverts at the Adjacent outfall. to plugged storm water inlets where a suction pump will convey the water back to the discharge system piping.

Discussion of each major treatment unit to be installed;

Specifications for the dredge pump are attached.

The conveyance piping run through the Adjacent Outfall will be 10-inch diameter HDPE for temporary construction of two lines accessed through the existing diversion chamber.

IAI has proved additional information regarding the polymerization in **Attachment 3**.

Sizing and loading for all major units;

The concentrator tank is

Three steel tanks having a capacity of over 170,000 gallons each will be utilized as shown in the process flow diagram on **Attachment 5**.

The geotextile filter tubes specified are 60-ft circumference and 100-ft long. Approximately 4 such tubes are anticipated to be necessary for this project. The tubes can be ordered at any length necessary.

Design calculations;

Design calculations are provided in **Attachment 4**.

Results of any pilot testing;

The treatability study report is provided as **Attachment 3**.

Start-up Procedures;

A general outline of the start-up procedures is provided below and subject to field modification based upon site conditions at the time of project completion, Contractor equipment and preferences to meet the project objectives and permit requirements.

- Develop access to the Rock River for necessary equipment;
- Survey the RAA (both laterally and vertically) to document initial conditions, mark the RAA boundary and deploy turbidity curtains, and monitoring buoys;
- Line the dewatering/treatment area, as necessary, to provide containment of liquids through the system;
- Construct the temporary piping system through the Adjacent Outfall exiting via the former grit chamber, continuing the conveyance past the polymer dosing equipment location, into the header manifold within the dewatering area, and connecting to the initial geotextile tubes;

The start-up of the dredging operations will begin at lower flowrates (1,000 to 1,500 gallons per minute) and limited to 12 hours per day. The dredging Contractor will be permitted to increase the flowrate (to a maximum of 2,500 gpm) once the process has been optimized.

Start and kill switches are located on deck of the barge system. A service panel with shut off will be on land at the electric drop location on the west side of the substation. Two-way radios and cell phone communication will be utilized between all personnel on site.

The slurry line has a siphon break where it enters the Concentrator tank. Typical check valve back-flow preventers are less reliable since the sand could prevent closure.

The City has granted permission for 24-hr operations; however, the Contractor does not expect operations outside of daylight hours. The decision to extend the work-shifts to a 16-hr or 24-hr day may be considered if the project is delayed and/or could run into unfavorable Fall weather.

Land application and handling description;

The solids will be placed in stockpiles or the geotextile tubes located within an impermeable (concrete or lined) area located west and north of the former tire building. The physical properties of dewatered sediments will be monitored. Moisture content, a paint-filter test, and “slump” test will periodically be conducted to monitor the dewatering process. A composite sample will be collected from a minimum of three locations from each stockpile or tube for characterization analyses once the material approaches a “truckable” state. The material will be relocated to the designated stockpile or shipped for off-site disposal based upon the analytical results, in comparison to industrial RCLs and beneficial re-use criteria.

Discussion on the operation and maintenance of all major units;

The dredging Contractor will perform all necessary and routine maintenance on its equipment (including pumps, meters, valves, etc.) to complete the project.

The polymer will be fed through an adjustable metering pump and then directly into the sump. The polymer will be mixed as it travels into the settling tank. The polymer is designed to be dosed at a rate

of 0.25 gallons per minute. The dosing rate will be manually adjusted to the minimum flow required to keep the supernatant from the settling tank visably clear.

Field monitoring equipment will be cleaned and calibrated per the manufacturers guidelines.

Discussion on how spills/bypasses/or malfunctions will be handled

The conveyance system for dredged materials will be located through the Adjacent Outfall and within the RAA; therefore, any leaks or ruptures to the hoses from the dredge or piping will drain back to the RAA where the turbidity curtain provides protection for bypasses.

The dewatering treatment area shall be constructed within an area providing adequate secondary containment of process fluids. Pumps will be available to divert any spills into the onsite steel storage tanks where the recovered material can be recirculated through the treatment system.

Outfall and conveyance system description;

The Adjacent Outfall consists of two 18-inch diameter pipes discharging to the Rock River through two 36-inch by 60-inch concrete box culverts. The temporary conveyance piping shall be 10-inch HDPE piping.

Outfall Location description;
See Figure 3 in Attachment 1.

Discussion of other local, county, or state permits required for the project

The City of Janesville has granted access to the Rock River via its property at end of Park Avenue, a local park, and permission for 24-hr operations. There is a consensus that expeditious completion of this project is in the interest of all stakeholders since the City desires to demolish the Monterey Dam.

A Remedial Action Design Report, and dredging permit application, in addition to the subject wastewater discharge permit has been sent to the DNR with copies of applicable documents to the Army Corps of Engineers.

Process flow diagram

A process flow diagram is included as Figure 7 in **Attachment 2**, along with system details. The project approach, as visualized on Figure 3, involves hydraulically dredging the impacted material out of the river in a slurry of river water and sediment. The slurry will then be conveyed through temporary piping installed through the Adjacent Outfall channel leading back to the diversion chamber at the Site (with a contingency for the operation of a booster pump near the grit chamber).

The project layout depicted on **Figure 3** proposes hydraulically dredging the impacted sediment using a shrouded Toyo 150B dredge pump and conveyance of the sediment / river water slurry to the former GM plant for dewatering and treatment. The slurry will be conveyed through a floating hose to temporary piping installed through the box culvert at the outfall leading back to the diversion chamber

located south of Delevan Drive at the former GM Site. The granular solids within the slurry will be removed by settling in a concentrator tank and across a drying bed. The fluids containing fine-grained particles (concentrator supernatant) will be pumped into the large steel tank (#1) for additional solids removal by settling that may include polymerization. The water fraction will be pumped into the return water tank (#2). A fraction of the settled solids containing fine particles and organic matter will be filtered through geotextile tubes, with the ellutriant captured and recirculated to the settling tank. Water from Tank #2 will be returned to the dredge pump head as make up water for dredging activities. Excess water will drain by gravity via an overflow pipe into the equalization tank (#3) for additional filtering through geotextile filters. The effluent will be sampled and discharged to either the local sanitary sewer system for additional treatment, or through granular activated carbon (GAC) prior to discharge into the River. Once dewatered, dried sediments will be characterized for proper re-use onsite or final disposal offsite, in accordance with the Sampling and Analyses Plan.

The manpower and equipment required to complete tis project will generally include the dredge operator, and deck hand and another to operate boat, monitor turbidity, flows, etc. The equipment is placed on a floating barge with rail winches, 150 HP pump, GPS tracking system, and work boat. The land crew will include a project manager/HSO, two equipment operators and laborers, and others as necessary to maintain the system(s). Equipment may consist of a wheel loader. Skid steer loader with bucket, forks, and broom attachments, and perhaps a second loader with equipment operator.

Previous analytical results from sediment and porewater samples indicate the dried sediments may provide beneficial re-use as fill materials during redevelopment of the Site. A stockpile will be created south of the grit chamber and best management practices (i.e., silt fence) will be utilized for storm water runoff protection in accordance with local and State law.

A treatment system schematic showing the location of piping, meters, sampling equipment, and valves.

See Figure 7 in **Attachment 2**.

The project layout is missing the final effluent outfall location. Please highlight the storm sewer piping and the final outfall location on this layout.

A revised Figure 3 is included as **Attachment 1**.

Please provide specifications for all mechanical equipment, such as sampling devices, meters, pumps, and treatment equipment that will be used.

See **Attachment 6** for manufacturers specifications for relevant system components.

ATTACHMENT 4

Design Calculations

Hydraulics for sediment conveyance

Flow:
Minimum of 500gpm
Maximum of 2500gpm

Pipe sizes:
12DR17 HDPE 11.16" ID

Conveyance Line Details
575ft length
2 90 elbows
15ft in elevation change
Equivalent pipe length: 675ft

Flow	Pipe	Dynamic Head Loss (ft)	Dynamic Head Loss (psi)	Total Head Loss (psi)
500	12DR17 HDPE	0.5	0.2	6.7
1000	12DR17 HDPE	1.8	0.8	7.3
1500	12DR17 HDPE	3.9	1.7	8.2
2000	12DR17 HDPE	6.7	2.9	9.4
2500	12DR17 HDPE	10.3	4.5	11.0
3000	12DR17 HDPE	14.37	6.2	12.7

Manifold/Hose Details
Trunk: 8DR17 HDPE 650' long
8" T fitting to 6" side outlet, butterfly valve, hose adapter to 100' length of 6" hose
10ft of elevation change

Hose Loss

Flow	# of Open Hoses	Dynamic Head Loss (psi) (each hose)	Velocity (fps) (per hose)
500	2	0.3	0.7

Branch Loss

Flow	# of Open Valves	Dynamic Head Loss (psi) (each branch)	Dynamic Head Loss (ft) (each branch)
500	2	0.1	0.3

Trunk Loss

Flow	Pipe	Dynamic Head Loss (psi)	Dynamic Head Loss (ft)
500	8DR17	1.5	3.5

TOTAL HEAD LOSS

Flow	Conveyance Line	Open Hoses	Total Head Req (psi)
500	8DR17	2	6.5

Plans are to keep 2+ hoses open at all times feeding to the geotextile filter tubes, under this condition 8DR11 pipe will be sufficient for the conveyance line and trunk of the header.

Special attention should be taken to ensure pressure to the influen tside of the conveyance line does not exceed 80psi under any condition, pipe is rated to handle 100psi continuously.

Chart shows required discharge pressure of pump to conveyance line to meet approximate desired flows.

Polymer will be injected into conveyance line at a dosage rate of approximately 2.6lbs/ton of dried sediment

WASTE LOADING

The "waste" is the sediment that is being removed thorugh dredging, it is expected to be conveyed to the geotextile filter tubes at a rate of 500-2500gpm. A polymer flocculant (PAC) will be injected into the conveyance line before the water and dredge material is discharged into the geotextile filter tubes. A bench study was performed to determine that a dosage of 2.9lbs per dry ton of sediment is sufficent for our treatment process.

The exact solids content and flow rate will vary through the duration of the project, but it is expected to be in a range of 25%-45%. Flow and concentration will be monitored from the Settling Tank and the dosage of PAC will be adjusted accordingly. Below is a sample table to show what dosage rates will be needed for various flow conditions.

Dry Density of Sedmiment: 14.9 lb/gal Dillution of PAC Solution: 50%

Flow Rate (gpm)	% Solids	Waste Loading (lb solids/min)	Dose (lb PAC/min)	Flow of PAC Solution at 17:1 ratio (gallons/min)
200	25	745	1.08	0.26
200	35	1,043	1.51	0.36
200	45	1,341	1.94	0.47
100	25	373	0.54	0.13
100	35	522	0.76	0.18
100	45	671	0.97	0.23

Basis

Tanks	170,000	gallons
Tank Height	24	ft
River Elev.	-	ft (datum)
Site Height	10.00	ft
Slurry Flow	2,500	gpm
Return Flow	2,000	gpm
		gpm

Mass Balance

Porosity	40%	Loose material
Particle Density	2.65	Sand
Dry Density	99.19	pcf

Design Parameters @ 2,500 gpm

% Solids (by wt.)	Slurry Density	Dry Solids Flow (lbs/min)	Sediment Removal (cy/hr)	Dry Solids Flow (gpm)	Saturated Solids Flow (gpm)
0%	1.00	-	-	-	-
5%	1.03	1,076	24	49	68
10%	1.07	2,223	50	101	141
15%	1.10	3,450	77	156	219
20%	1.14	4,763	107	216	302
25%	1.18	6,173	138	279	391
30%	1.23	7,692	172	348	487
35%	1.28	9,331	209	422	591

Head:	Elevation	10	River to Site
	Elevation	26	Top of Concentrator
	Friction	23	at 3,000 gpm. Actual @ 2,500
	Total	59	

Retention Time

	gpm	hours
Settling Tank	2,000	1.42
Return Tank	2,000	1.42
Equal. Tank	500	5.67

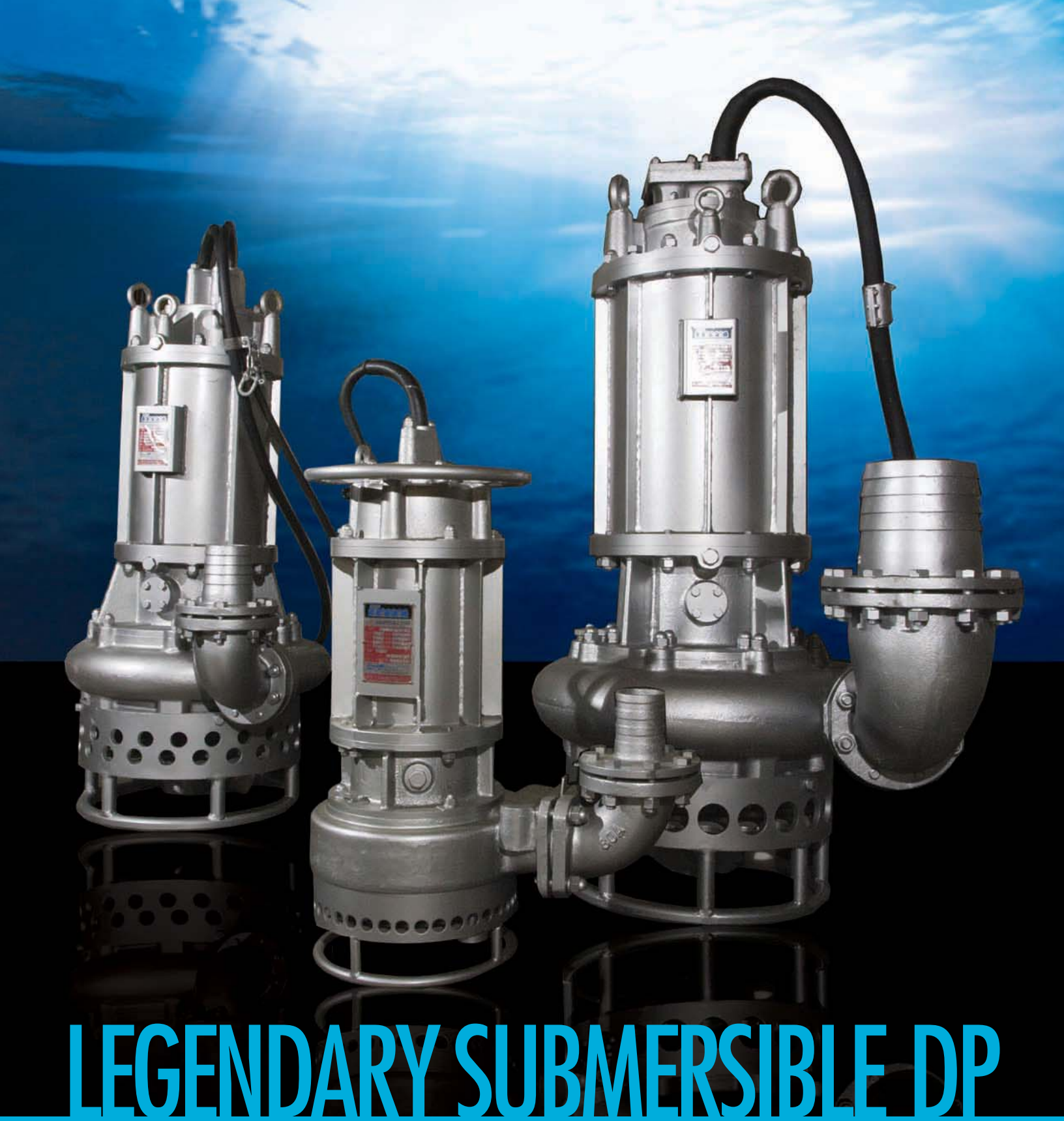
Wasting Rates (Saturated)

Conversion	3.37	cy/hr to gpm

100 cy/hr
200 cy/hr

ATTACHMENT 5

Equipment specifications and information



LEGENDARY SUBMERSIBLE DP

Heavy duty submersible slurry pump design for the world's toughest applications

TOYO PUMPS

www.toyopumps.com

DP and TO

The Toyo submersible DP series and its hydraulically driven cousin the TO series were specifically designed to pick up and transport abrasive materials with the least amount of water. The DP/TO is a pump and excavator in one. The design incorporates the patented Toyo agitator, attached directly to the pump shaft, which together with the closed impeller, large open passages for the easy passage of solids, heavy duty shaft/bearing configuration and custom built motor with 1.35 service factor, result in the most rugged submersible slurry pump on the market today.

DP Quick facts

- Capacities up to 3200 Usgpm @BEP
- Heads to 130 ft @ BEP
- Pumps up to 70% solids
- Handles solids up to 4.72" in diameter
- Sizes up to 10" in diameter
- Patented high chrome agitator as standard – attached directly to the pump's shaft
- Front (adjustable) and Back high chrome wear plates
- Unique 1.35 S.F. motor
- Heavy duty motor housing
- Low RPM for reduced wear
- Additional bearing support between primary and secondary seal elements

The Toyo patented agitator eliminates solids accumulating on the sump floor and can significantly reduce maintenance costs resulting from digging out sumps and downtime due to solids building up and choking off the suction of conventional pumps. It is because of the Toyo Agitator's patented blade that the highest efficiency in material mixing can be achieved.

Available adders

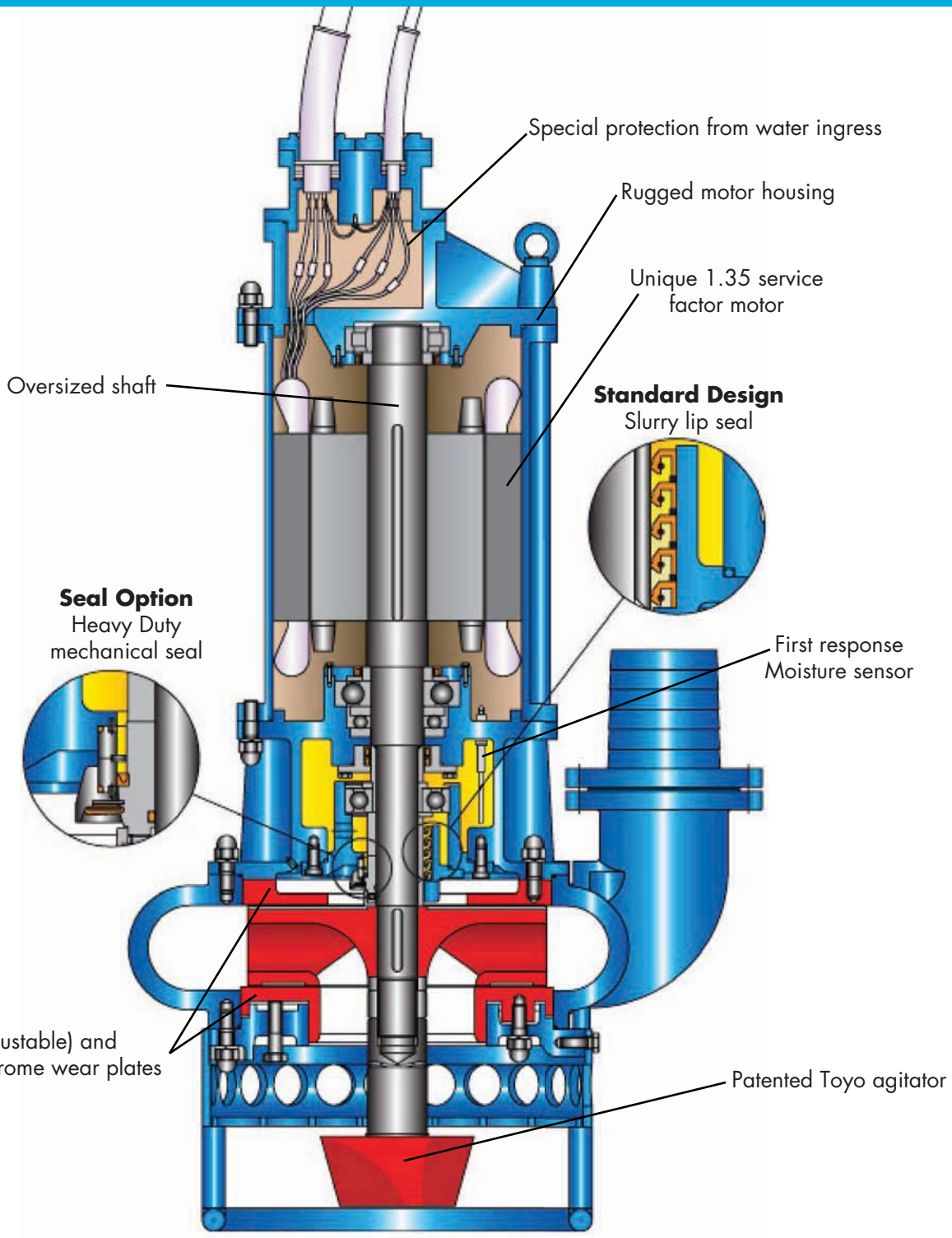
- Hydraulic drive available (TO)
- Optional jet ring attachment to dislodge tough solids
- High temperature package
- Mechanical seals
- Further designs up to 600HP (non standard)

In applications where solids are especially difficult to pump, or simply where more agitation is required, Toyo offers a special high pressure jet ring. This combination of jet ring and agitator have proven to be a truly effective 'agitation team'.

TOYO PUMPS

www.toyopumps.com

TOYO DP Series



The Legendary Toyo DP has been working in the world's toughest and most abrasive applications for 6 decades.








Visit www.toyopumps.com to see full pictorial case studies and download videos showing this heavy duty pump at work.

You'll find the Toyo DP pumps working in the applications below as well as many others:

- Dredging
- Ocean Sand mining
- Tailings ponds
- Fly ash/ bottom ash
- Sand and Gravel excavation
- Hazardous waste clean-up
- Tank clean up (replacing vacuum trucks)
- Cleaning out numerous sumps including at:
- Cement plants
- Agricultural wash down pits (carrots, beats etc)
- Pipeline burial
- Coke pits
- Mill scale/ slag pits
- Barge unloading
- Silt removal
- Removal of filer media at waste treatment plants
- Island building

TOYO PUMPS

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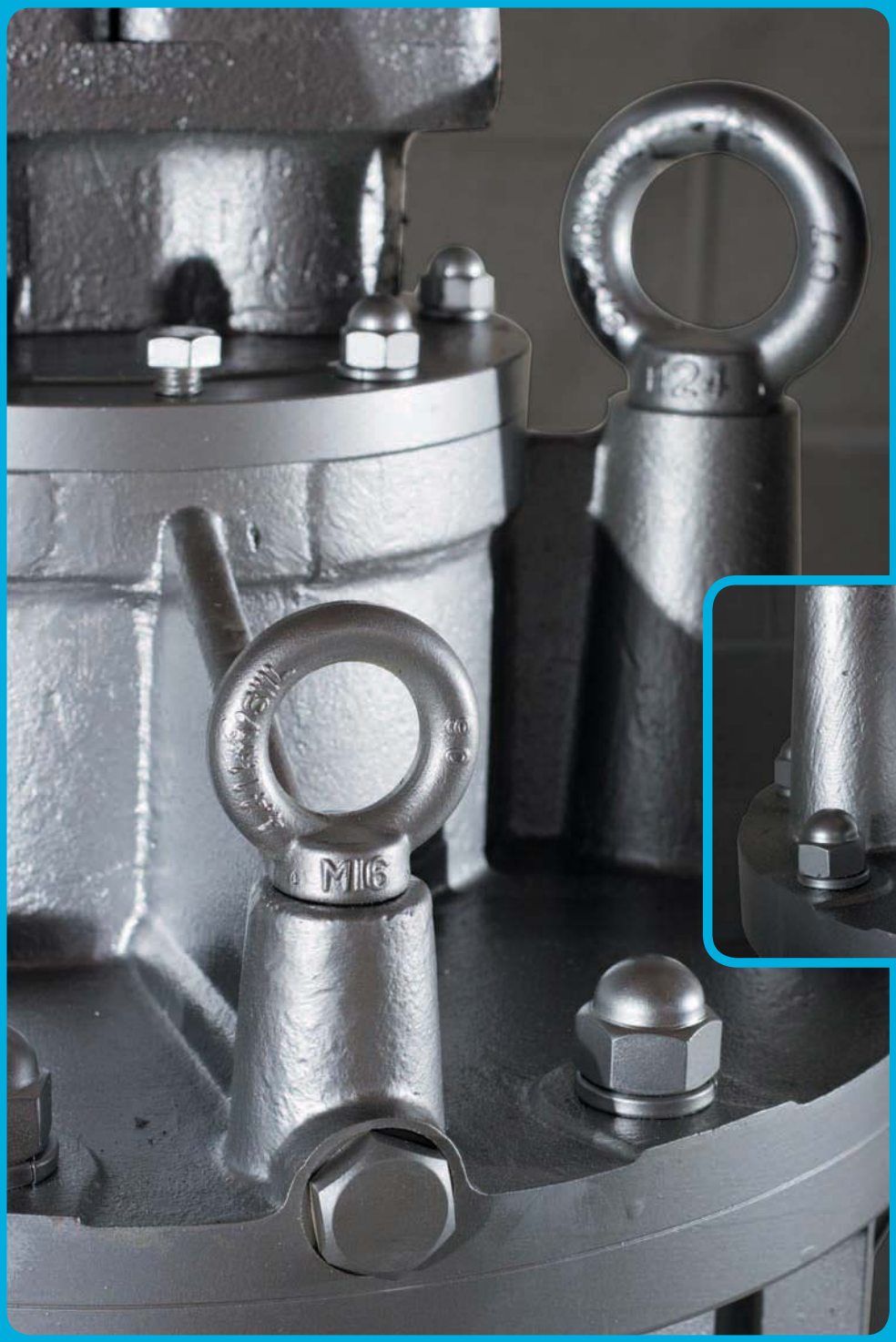
The DP's heavy duty construction makes it the toughest submersible slurry pump on the market today.



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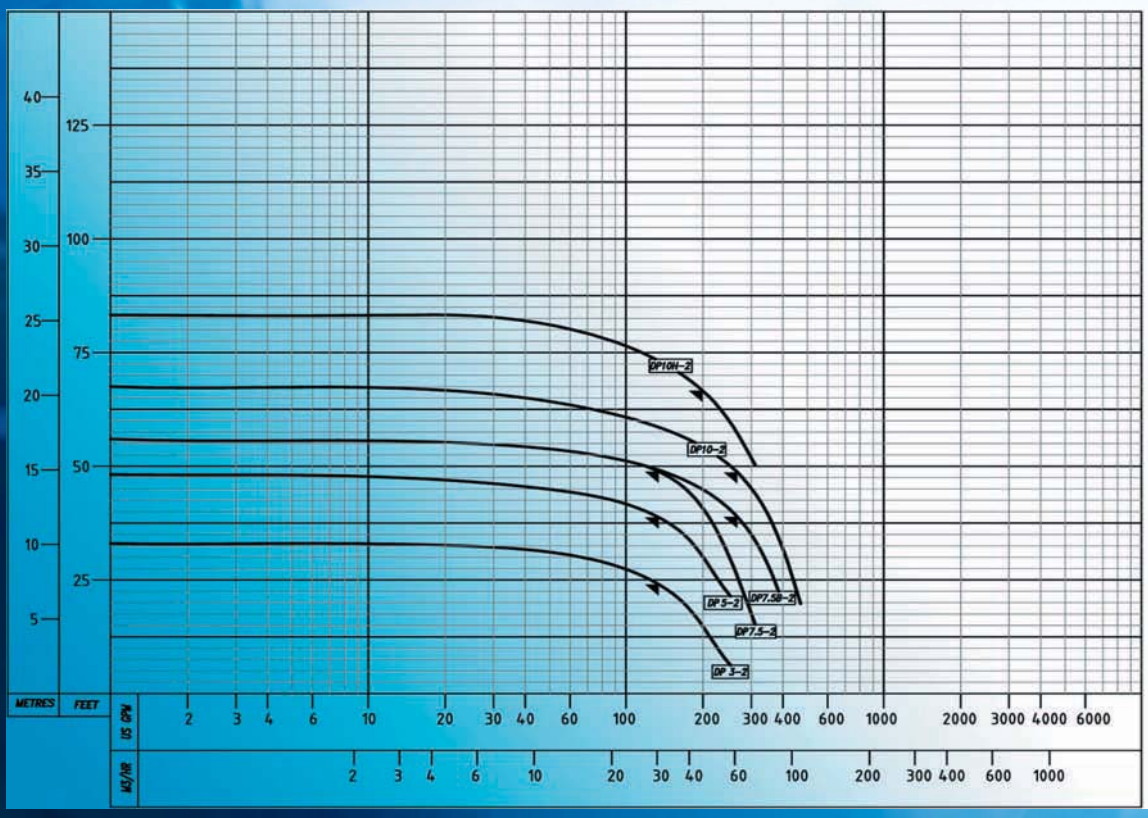
Legendary DP Specifications

MODEL NUMBER	DP-3-2	DP-5-2	DP-7.5-2	DP-7.5B-2	DP-10-2	DP-10H-2	DPF-15	DPF-15B	DPF-20	DPF-20B
Discharge diameter - inch (mm)	3 (80)	3 (80)	3 (80)	4 (100)	4 (100)	4 (100)	4 (100)	6 (150)	4 (100)	6 (150)
Flow at rated point - Usgpm (m3/min)	132 (0.5)	132 (0.5)	132 (0.5)	264 (1.0)	264 (1.0)	198 (0.75)	400 (1.5)	880 (3.33)	400 (1.5)	880 (3.33)
Head at rated point - ft (m)	23 (7.0)	39 (11.9)	49 (14.9)	39 (11.9)	49 (11.9)	66 (20.1)	49 (11.9)	24 (7.3)	65 (19.8)	33 (10.0)
Impeller diameter - inch (mm)	7.28 (185)	8.23(209)	9.13 (232)	9.13 (232)	9.53 (242)	10.5 (266)	12.6 (320)	11.5 (290)	13.9 (353)	11.8 (300)
Impeller - number of vanes	3	3	3	3	4	6	3	3	2	3
Max. solid size - inch (mm)	0.8 (20)	0.8 (20)	1.0 (25)	1.0 (25)	1.0 (25)	0.55 (14)	1.4 (35)	2.4 (60)	1.4 (35)	2.4 (60)
Weight without cable - lb (kg)	320 (145)	342 (155)	430 (195)	430 (195)	430 (195)	495 (225)	1036 (470)	1124 (510)	1212(550)	1190(540)
Standard motor hp	3	5	7.5	7.5	10	10	15	15	20	20
Optional motor hp	5	N/A	10	10	N/A	N/A	20	20	30	30
Standard seal	Dbl. Mec. Sl	Dbl. Mec. Sl.	Dbl. Mec. Sl	Dbl. Mec. Sl.	Dbl. Mec. Sl	Dbl. Mec. Sl.	Toyo lip	Toyo lip	Toyo lip	Toyo lip
Oil capacity - slurry lip seal - USgal	N/A	N/A	N/A	N/A	N/A	N/A	1.1 (4.1)	1.1 (4.1)	1.1 (4.1)	1.1 (4.1)
Oil capacity - mechanical seal - Usgal	.58 (2.2)	.58 (2.2)	.69 (2.6)	.69 (2.6)	.69 (2.6)	.69 (2.6)	0.87 (3.3)	0.87 (3.3)	0.87 (3.3)	0.87 (3.3)
Number of bearings	3	3	3	3	3	3	4	4	4	4
Speed (rpm)	1740	1740	1750	1750	1750	1750	1170	1170	1160	1160
Voltage	220/460/575	220/460/575	220/460/575	220/460/575	220/460/575	220/460/575	220/460/575	220/460/575	220/460/575	220/460/575
F.L. current	8.5 / 4.2 / 3.4	13 / 6.6 / 5.3	20 / 10.1 / 8.0	20 / 10.1 / 8.0	26 / 13 / 10.3	26 / 13 / 10.3	40/20/16	40/20/16	54/27/21	54/27/21
Breaker settings	11.5/5.7/4.6	17.5/8.9/7.2	27/13.6 /10.8	27/13.6/10.8	35/17.5/13.9	35/17.5 /13.9	54/27/21.6	54/27/21.6	73/36/28	73/36/28
Motor protector - Klixon (Thermostat in windings from DPF-15)	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Moisture sensor + relay	Optional	Optional	Optional	Optional	Optional	Optional	Standard	Standard	Standard	Standard
Starting method	D.O.L.	D.O.L.	D.O.L.	D.O.L.	D.O.L.	D.O.L.	D.O.L.	D.O.L.	D.O.L.	D.O.L.
Motor service factor	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35
Sensor cable (replacement type)	sow 4 - 10	sow 4 - 10	sow 4 - 10	sow 4 - 10	sow 4 - 10	sow 4 - 10	sow 4 - 10	sow 4 - 10	sow 4 - 10	sow 4 - 10
Power cable (replacement type)	sow 4 - 10	sow 4 - 10	sow 4 - 8	sow 4 - 8	sow 4 - 8	sow 4 - 8	ggc 3c - 8	ggc 3c - 8	ggc 3c - 8	ggc 3c - 8
Electric cable length - ft (m)	65 (20)	65 (20)	65 (20)	65 (20)	65 (20)	65 (20)	65 (20)	65 (20)	65 (20)	65 (20)
Insulation Class	F	F	F	F	F	F	F	F	F	F
Max. pumpage temp. STD INS.	115ŶF	115ŶF	115ŶF	115ŶF	115ŶF	115ŶF	115ŶF	115ŶF	115ŶF	115ŶF
Max. pumpage temp. OPT INS.	175ŶF	175ŶF	175ŶF	175ŶF	175ŶF	175ŶF	175ŶF	175ŶF	175ŶF	175ŶF
Max. run time motor in air	15 min	15 min	15 min	15 min	15 min	15 min	15 min	15 min	15 min	15 min
Water jacket	Optional	Optional	Optional	Optional	Optional	Optional	Optional	Optional	Optional	Optional
Water jacket flow rate	1-3 gpm	1-3 gpm	1-3 gpm	1-3 gpm	1-3 gpm	1-3 gpm	3-5 gpm	3-5 gpm	3-5 gpm	3-5 gpm
Shaft	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel
Pump casing STD	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron
Pump casing OPT	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr
Impeller	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr
Wear plate - top	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron	28% Chr	28% Chr	28% Chr	28% Chr
Wear plate - bottom	N/A	N/A	N/A	N/A	N/A	N/A	28% Chr	28% Chr	28% Chr	28% Chr
Suction cover	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	Cast Iron	Cast Iron	Cast Iron	Cast Iron
Agitator	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr
Sacrificial stub shaft	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

MODEL NUMBER	DPF-30	DPF-30B	DPF-50	DPF-50B	DPF-75	DPF-75B	DP-100B	DP-110B	DP-150B
Discharge diameter - inch (mm)	4 (100)	6 (150)	6 (150)	8 (200)	6 (150)	8 (200)	8 (200)	8 (200)	10 (250)
Flow at rated point - Usgpm (m3/min)	400 (1.5)	880 (3.33)	880 (3.33)	1600 (6.0)	880 (3.33)	1600 (6.0)	1600 (6.0)	1600 (6.0)	3200 (12)
Head at rated point - ft (m)	98 (29.9)	49 (11.9)	82 (25.0)	48 (14.6)	115 (35.2)	95 (29.0)	98 (30.0)	130 (40.0)	72 (22.0)
Impeller diameter - inch (mm)	16.56 (420)	14.0 (358)	14.94 (380)	14.94 (380)	16.92 (430)	16.92 (430)	21.65 (550)		25 (635)
Impeller - number of vanes	2	3	2	3	3	3	3	3	2
Max. solid size - inch (mm)	1.4 (35)	2.4 (60)	2.4 (60)	2.4 (60)	2.4 (60)	2.4 (60)	2.4 (60)	2.0 (50)	4.72 (120)
Weight without cable - lb (kg)	1653 (750)	1610 (730)	2100 (950)	2140 (970)	2410 (1095)	2450 (1113)	4850 (2200)	4850 (2200)	7700 (3500)
Standard motor hp	30	30	50	50	75	75	100	110	150
Optional motor hp	40	40	60 or 75	60 or 75	Inquire	Inquire	Inquire	Inquire	Inquire
Standard seal	Toyo lip	Toyo lip	Toyo lip	Toyo lip	Toyo lip	Toyo lip	Toyo lip	Toyo lip	Toyo lip
Oil capacity - slurry lip seal - Usgal	1.56 (5.9)	1.56 (5.9)	1.64 (6.2)	1.64 (6.2)	1.64 (6.2)	1.64 (6.2)	6.6 (25)	6.6 (25)	7.9 (30)
Oil capacity - mechanical seal - USgal (l)	1.24 (4.7)	1.24 (4.7)	1.3 (5.0)	1.3 (5.0)	1.3 (5.0)	1.3 (5.0)	6.6 (25)	6.6 (25)	7.9 (30)
Number of bearings	4	4	4	4	4	4	5	5	6
Speed (rpm)	1185	1185	1185	1185	1185	1185	885	885	705
Voltage	220/460/575	220/460/575	220/460/575	220/460/575	220/460/575	220/460/575	460 / 575	460 / 575	460 / 575
F.L. current	80/40/ 32	80/40/32	126/63 / 50	126/63/50	182/91/77	182/91/77	124/103	124/103	176/145
Breaker settings	108/54/43	108/54/43	170/85/67	170/85/67	245/123/104	245/123/104	167 / 138	167 / 138	237 / 195
Motor protector - Klixon (Thermostat in windings from DPF-15)	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Moisture sensor + relay	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Starting method	D.O.L.	D.O.L.	D.O.L.	D.O.L.	D.O.L.	D.O.L.	D.O.L.	D.O.L.	D.O.L.
Motor service factor	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.2	1.35
Sensor cable (replacement type)	sow 4 -10	sow 4 - 10	sow 4 - 10	sow 4 - 10	sow 4 - 10	sow 4 - 10	sow 4 - 10	sow 4 - 10	N/A
Power cable (replacement type)	ggc 3c - 4	ggc 3c - 4	ggc 3c - 1	ggc 3c - 1	ggc 3c - 1	ggc 3c - 1	ggc 3c -3/O	ggc 3c - /O	ggc 3c -50*
Electric cable length - ft (m)	65 (20)	65 (20)	65 (20)	65 (20)	65 (20)	65 (20)	65 (20)	65 (20)	65 (20)
Insulation Class	F	F	F	F	F	F	B	B	B
Max. pumpage temp. STD INS.	115ŶF	115ŶF	115ŶF	115ŶF	115ŶF	115ŶF	115ŶF	115ŶF	115ŶF
Max. pumpage temp. OPT INS.	175ŶF	175ŶF	175ŶF	175ŶF	175ŶF	175ŶF	175ŶF	175ŶF	175ŶF
Max. run time motor in air	15 min	15 min	15 min	15 min	15 min	15 min	15 min	15 min	15 min
Water jacket	Optional	Optional	Optional	Optional	Optional	Optional	Optional	Optional	Optional
Water jacket flow rate	3-5 gpm	3-5 gpm	3-5 gpm	3-5 gpm	3-5 gpm	3-5 gpm	3-5 gpm	3-5 gpm	3-5 gpm
Shaft	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel
Pump casing STD	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron
Pump casing OPT	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr
Impeller	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr
Wear plate - top	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr
Wear plate - bottom	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr
Suction cover	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
Agitator	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr	28% Chr
Sacrificial stub shaft	N/A	N/A	Included	Included	Included	Included	Included	Included	Included

Legendary DP Curves



TOYO PUMPS

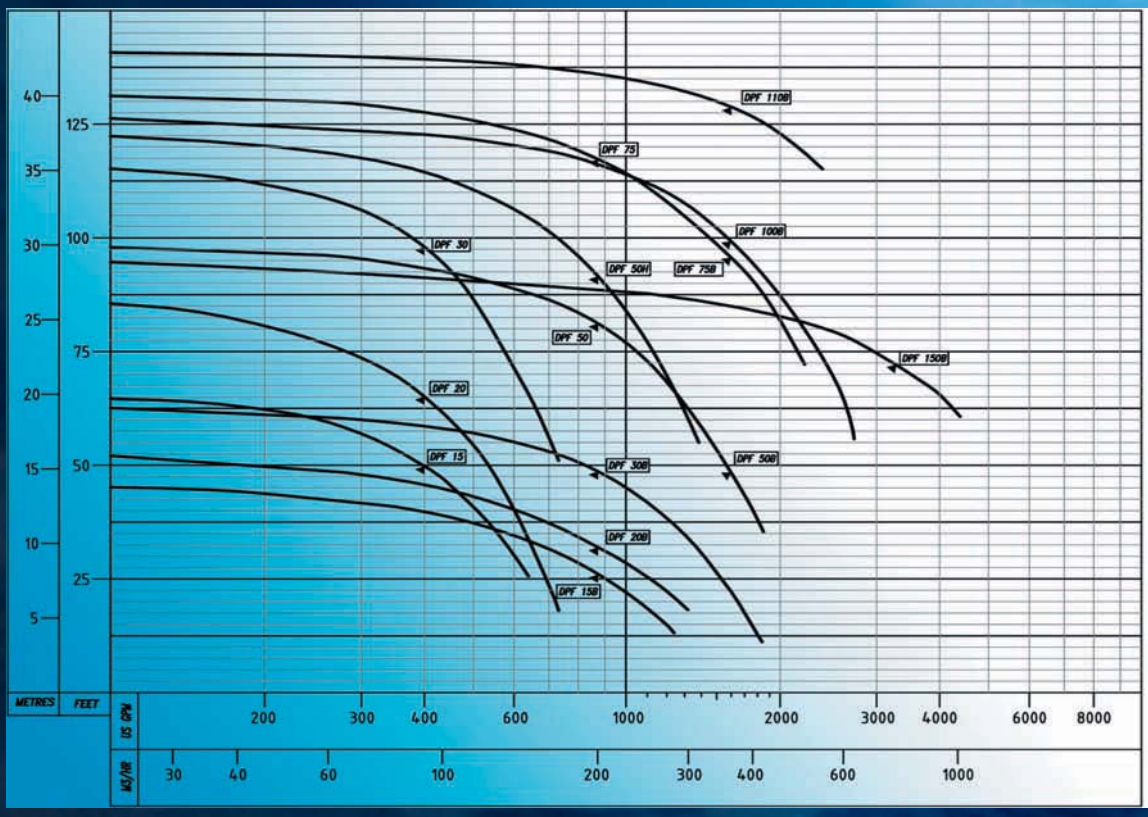
WWW.TOYOPUMPS.COM

TOYO PUMPS NORTH AMERICA CORPORATION
BURNABY, BRITISH COLUMBIA
CANADA V5C 6H2
TEL : (604)298-1213 FAX : (604)298-7773

PUMP MODEL	DP 3-2 TO 10H-2		
CURVE NUMBER	A7639	REV.	0
CAPACITIES TO:	M3/HR	74 @ BEP	
	U.S. GPM	325 @ BEP	
HEAD TO:	METRES	16 @ BEP	
	FEET	52.5 @ BEP	

TPNA MODEL	DISCHARGE MM	DISCHARGE IN	MAX #SOLIDS MM	MAX #SOLIDS IN	IMPELLER MM	IMPELLER IN
DP3-2	80	3	20	0.8	185	7.3
DP5-2	80	3	20	0.8	209	8.2
DP7.5-2	80	3	25	1.0	232	9.1
DP7.5B-2	100	4	25	1.0	232	9.1
DP10-2	100	4	25	1.0	242	9.5
DP10H-2	100	4	14	0.6	266	10.5

PERFORMANCE FOR WATER @ 68°F/20°C AND 1.0 S.G. CORRECT FOR OTHER CONDITIONS AND/OR SOLIDS EFFECT



TOYO PUMPS

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TOYO PUMPS NORTH AMERICA CORPORATION
BURNABY, BRITISH COLUMBIA
CANADA V5C 6H2
TEL : (604)298-1213 FAX : (604)298-7773

PUMP MODEL	DPF 15 TO 150B		
CURVE NUMBER	A7195	REV.	0
CAPACITIES TO:	M3/HR	727 @ BEP	
	U.S. GPM	3200 @ BEP	
HEAD TO:	METRES	39.6 @ BEP	
	FEET	130 @ BEP	

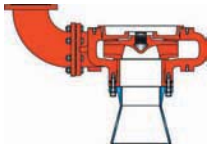
TPNA MODEL	DISCHARGE MM	DISCHARGE IN	MAX SOLIDS # MM	MAX SOLIDS # IN	IMPELLER # MM	IMPELLER # IN
DP15	100	4	35	1.4	320	12.6
DP15B	150	6	60	2.4	290	11.5
DP20	100	4	35	1.4	353	15.9
DP20B	150	6	60	2.4	300	11.8
DP30	100	4	35	1.4	420	16.6
DP30B	150	6	60	2.4	358	14
DP50/B	150/200	6/8	60	2.4	380	15.0
DP50H	150	6	40	1.6	447	17.6
DP75/B	150/200	6/8	60	2.4	430	16.9
DP100B	200	8	60	2.4	550	21.7
DP110B	200	8	50	2.0	–	–
DP150B	250	10	120	4.7	635	25

PERFORMANCE FOR WATER @ 68°F/20°C AND 1.0 S.G. CORRECT FOR OTHER CONDITIONS AND/OR SOLIDS EFFECT

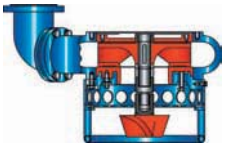
TOYO PUMPS

www.toyopumps.com

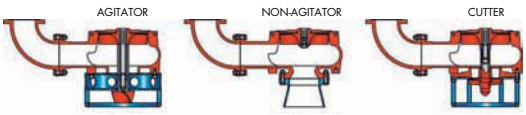
The Toyo Modular Program allows you the flexibility of using the wet ends below on various drive configurations. This advantage of the Toyo Product Line can significantly reduce spare parts inventory to an absolute minimum.



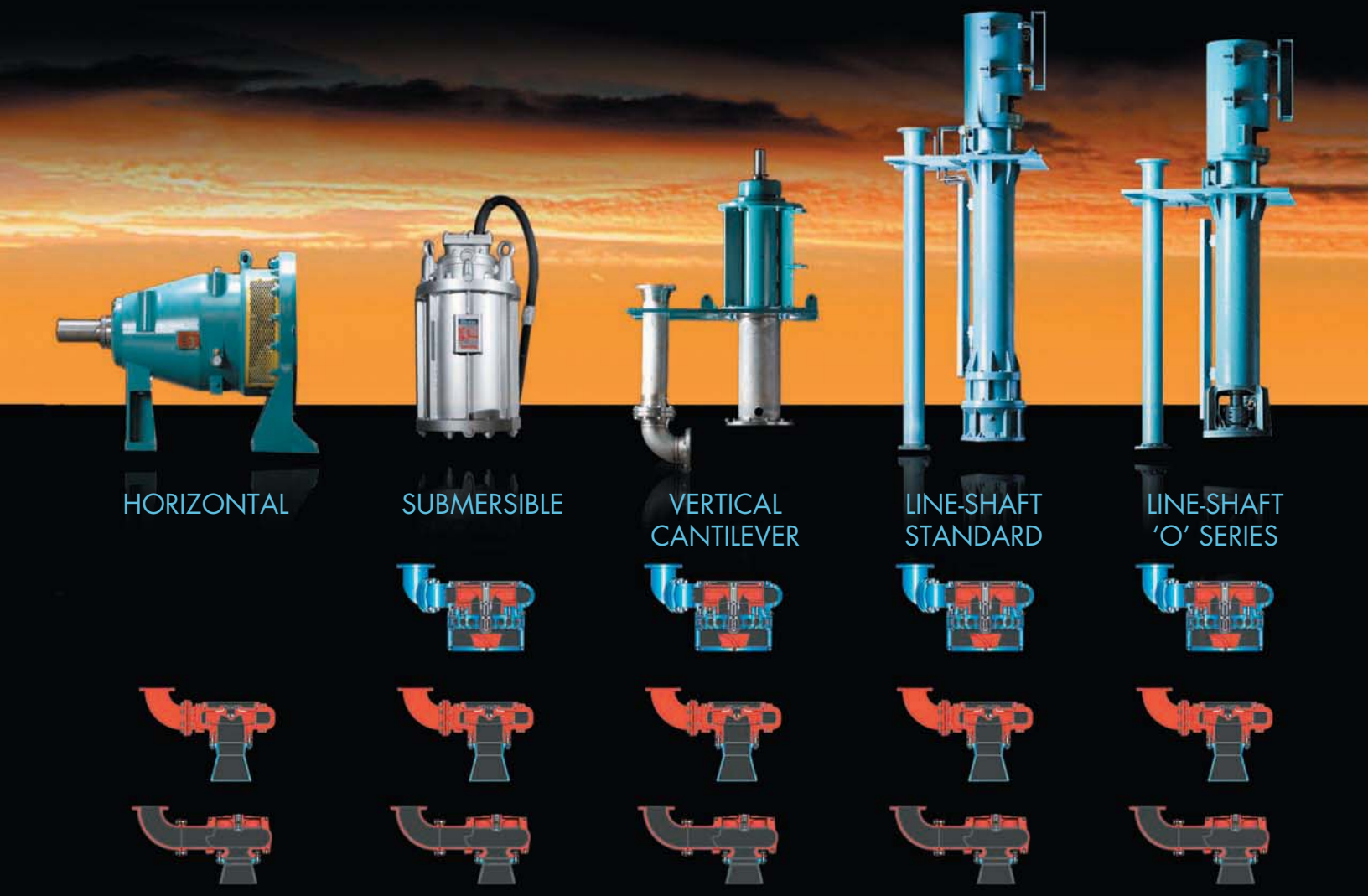
- Heavy solid handling capability
- Closed impeller
- Heavy metal sections for longer wear life
- Increased efficiencies in state of the art slurry pump design



- Heavy solid handling capability
- Closed and semi-open impellers available
- Patented Agitator Option
- Heavy metal sections for longer wear life



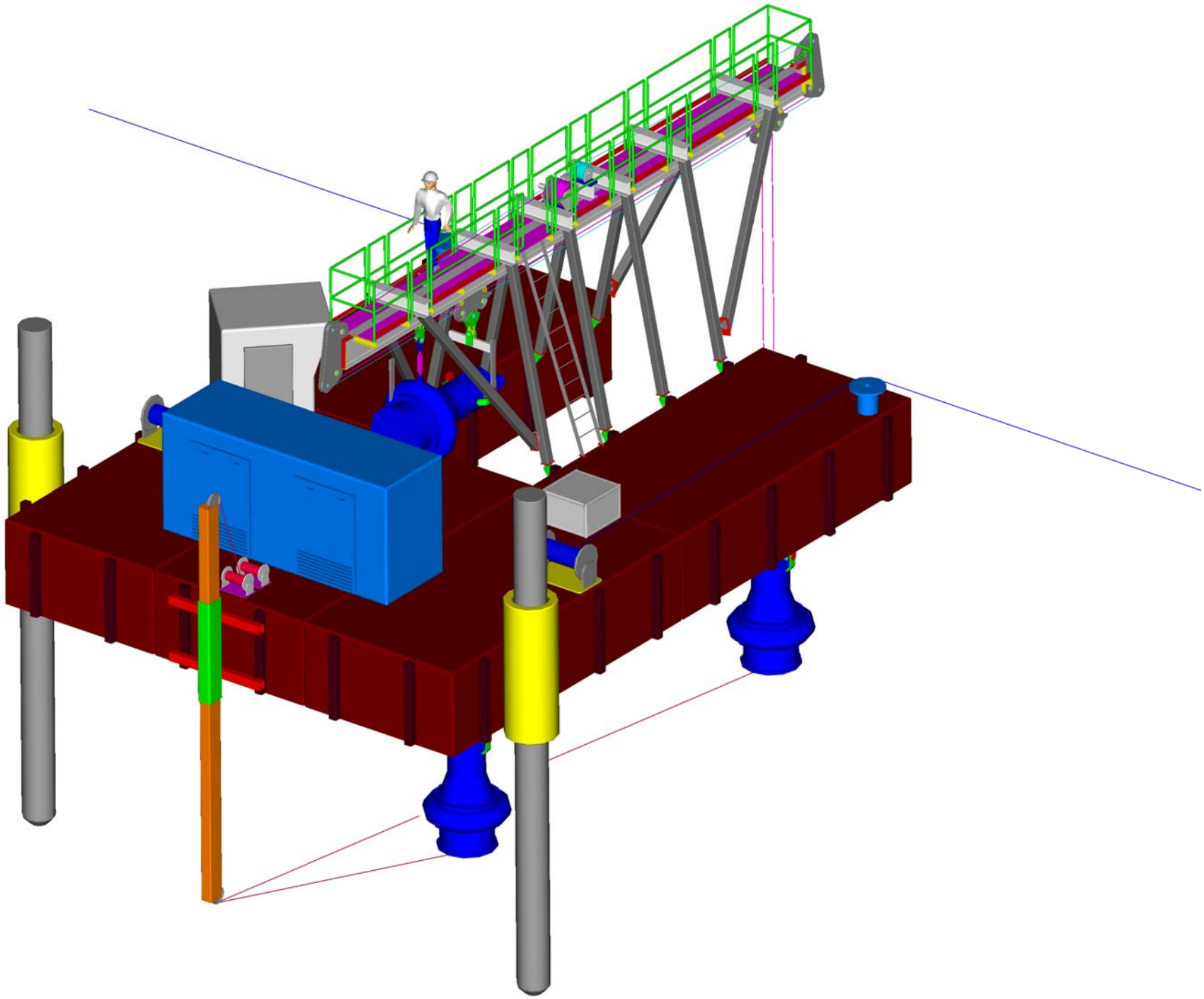
- Spiral casing design for increased efficiency and reduced wear
- Fully recessed impeller allows for large solids passage
- Only approx 15% of pumped liquid is in contact with impeller
- Wet end standard in High Chrome and CD4
- Patented Agitator and Chopper options available



Toyo Pumps North America
Corporate Head Office
2853 Douglas Rd
Burnaby, B.C.
Canada V5C 6H2

TOYO PUMPS

For more information please visit
www.toyopumps.com



Rock Road Co. ,Inc.

Deposit Ident.: Townline East **Project:** VARIOUS

Producer: Michels **Contract #:** VARIOUS

Start Date: 08/31/17 **Spec:**

Finish Date:

Material: **Mason Sand**

				#4	#8	#16	#30	#50	#100	#200
		2.36		**99.9**	**98.6**	**84.5**	**61.2**	**17.6**	**2.4**	**0.8**
08/31/17	001-01	2.34	8.7%	100	98	84	61	20	3	0.8
09/01/17	002-01	2.38	5.0%	100	98	83	60	17	3	0.8
09/05/17	003-01	2.53	4.3%	100	95	76	54	18	4	1.1
09/06/17	004-04	2.57	4.8%	100	96	75	53	17	3	0.9
09/07/17	005-01	2.56	4.7%	100	96	76	54	16	3	0.9
09/08/17	006-01	2.70	5.0%	100	93	70	48	15	4	1.2
09/08/17	006-02	2.58	8.5%	100	95	75	53	16	3	0.9
09/09/17	007-01	2.42	7.6%	100	100	82	56	16	4	1.2
09/11/17	008-01	2.28	5.3%	100	100	86	62	20	4	1.1
09/12/17	009-01	2.34	6.0%	100	100	85	60	18	4	1.0
09/13/17	010-01	2.51	8.7%	100	96	78	55	16	3	1.1
09/14/17	011-01	2.48	5.7%	100	96	79	56	17	3	0.9
09/14/17	012-01	2.46	5.9%	100	97	79	56	18	4	1.2
09/15/17	013-01	2.61	4.7%	100	95	73	51	16	4	1.0
09/18/17	014-01	2.38	4.0%	100	99	83	59	18	4	1.2
09/19/17	015-01	2.39	5.4%	100	99	83	59	17	4	1.0
09/20/17	016-01	2.36	5.4%	100	99	83	60	19	4	0.9
Avg.		**2.46**		**100.0**	**97.1**	**79.3**	**56.3**	**17.3**	**3.6**	**1.0**

a Babcock Power Inc. company
2401 Pewaukee Road
Waukesha, WI 53188-6904

January 1, 2018

Turbidity Barrier Certification

This is to certify that the GSI Turbidity Curtain meets the Wisconsin DOT standards as laid out in section 628.2.10 of the Standard Specification Manual. The product is constructed using 5/16" cable and 5/16" chain. The impermeable material values are indicated below. Grommets are inserted at the ends of all units.

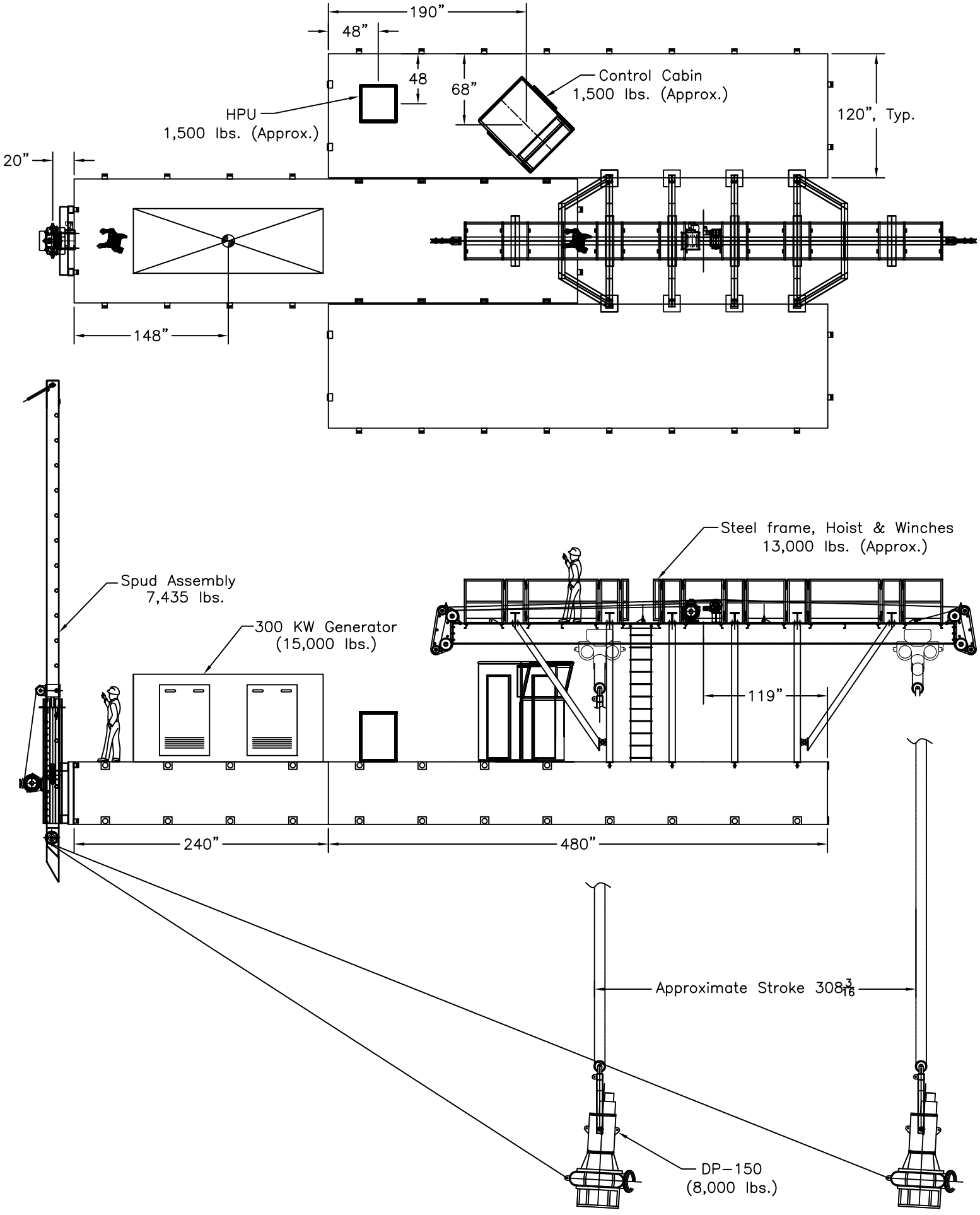
RAVEN PROTECTOR
POLYETHYLENE SHEETING
Product Code: W20B

TEST REQUIREMENTS	METHOD	VALUE
Minimum grab tensile strength	ASTM D 4632	303 LB
Minimum puncture strength	ASTM D 4833	161 LB
Maximum permeability	ASTM D 4491	9x10 -9 cm/s
Minimum ultraviolet stability (strength retained at 500 hrs of exposure)	ASTM D 4355	90%

The values listed above are typical properties and are intended to be used as guidelines only. No guarantee or warranty regarding performances of this product is made by Raven Industries. as the manner of use, handling, and conditions are beyond our control. Install in accordance with accepted industry standards.

Sincerely,

John O'Connell
President
Geo-Synthetics Systems, LLC


190”
48”
48
68”
Control Cabin
1,500 lbs. (Approx.)
HPU
1,500 lbs. (Approx.)
120”, Typ.
20”
148”
Steel frame, Hoist & Winches
13,000 lbs. (Approx.)
Spud Assembly
7,435 lbs.
300 KW Generator
(15,000 lbs.)
119”
240”
480”
Approximate Stroke 308 3/16
DP–150
(8,000 lbs.)

PRODUCT DATA SHEET

November, 2013

UPRIGHT CONE BOTTOM TANK (420 BBL)

GENERAL INFORMATION

420 BBL Fixed Axle Cone-Bottom Upright Tank was designed to reduce costs while increasing efficiency and safety in mud and gel-related drilling operations.

WEIGHTS AND MEASURES

» Capacity:	420 BBL (17,640 gallons)
» Overall Height:	33' (base to trailer nose)
» Tank Footprint:	12' x 12'
» Weight:	22,500 (empty)
» Tongue Weight:	9,000 (empty)

STRUCTURAL DESIGN

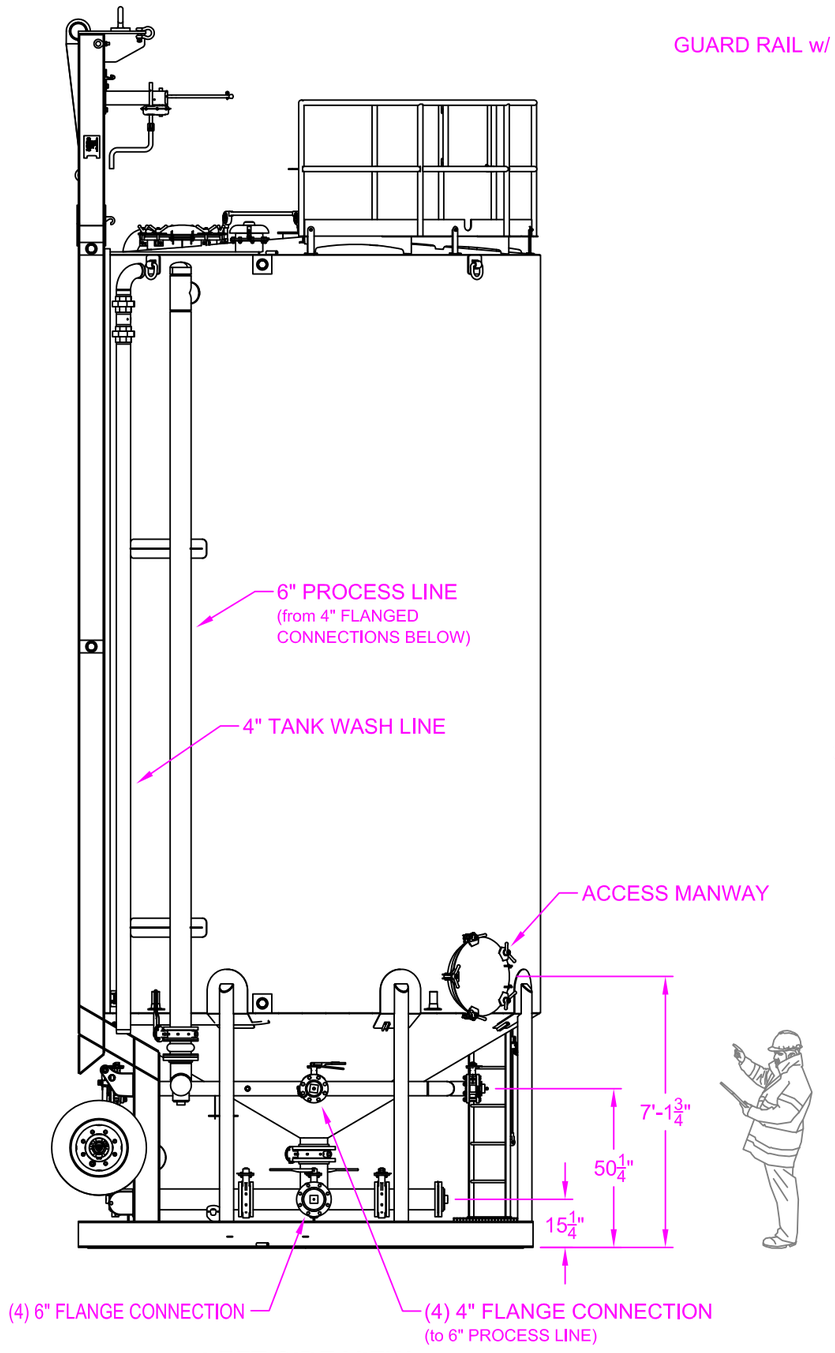
» Framing/Supports:	ASTM A36 Carbon Steel
» Piping:	Carbon Steel
» Lifting Connections:	Four (4) heavy duty steel lifting lugs on top of tank
» Max Wind Loading:	120 MPH (or equivalent wind pressure of 24 PSF)

FEATURES

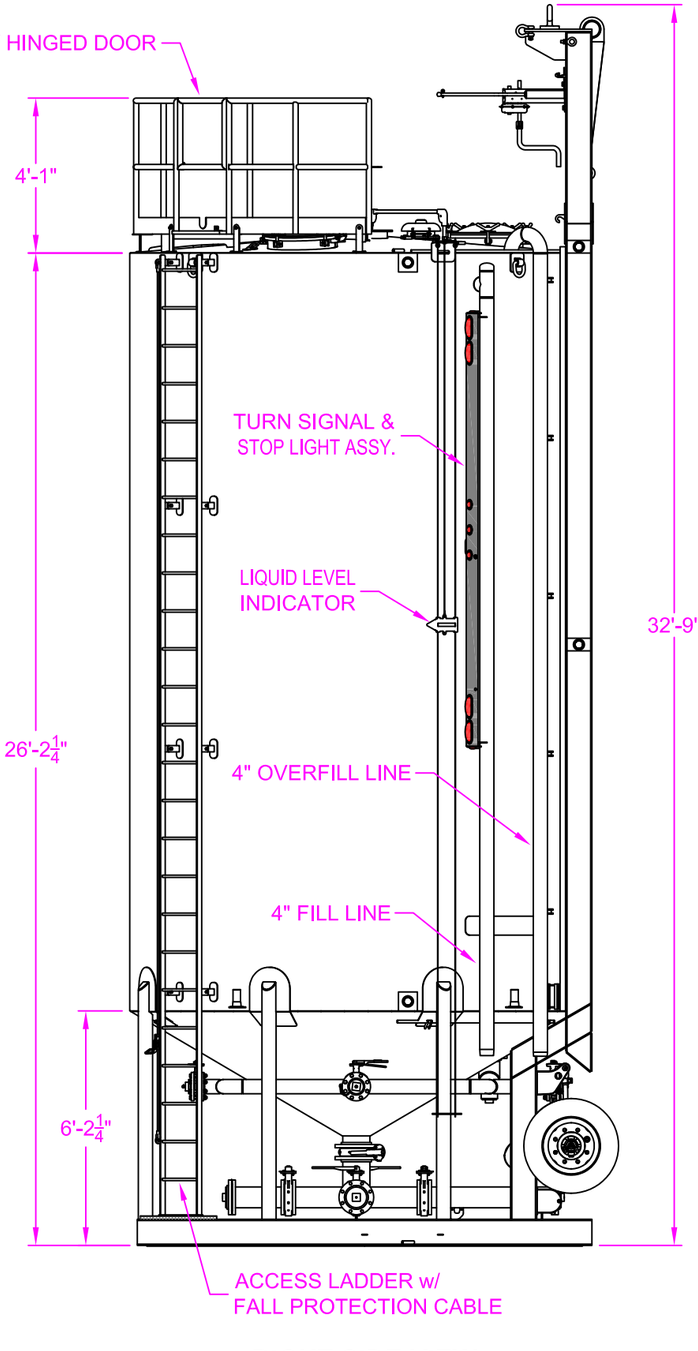
» Ladder & Hand Rails:	One ladder and top hand rails with OSHA compliant fall arrest tie-off system. Galvanized walking surface within hand rail area.
» Fixed Axle Frame Assembly:	Fixed axle frame equipped with air brake hose connections and wiring harness connection for tail lights. Frame equipped with manual landing gear and pintle hitch connection plate at front of frame. Frame is equipped with reflectors around the perimeter of the frame.
» Pressure/Vacuum Relief Valve:	16 oz./in^2 pressure setting, 0.4 oz./in^2 vacuum setting; Buna-N seal.
» Manways:	Two (2) 22" heavy-duty steel manways located on top of tank with Buna-N seal. One (1) 22" heavy-duty steel manways located on side of tank with Buna-N seal.
» Rinse Pipe:	4" steel rinse pipe connection and internal wash ring at top of tank for simple self-cleaning.
» Bottom Manifold:	Built-in 6" manifold "T" with four connections 90 degrees apart. Manifold equipped with blinds and 6" butterfly valves
» Recirculation Manifold:	Built-in 4" manifold with four connections 90 degrees apart. Manifold equipped with blinds and 4" butterfly valves.
» Rigging Cables and Connections:	Tank includes fitted steel cables and shackles for ease of lowering and raising tank upright.
» Level Gauge:	Mechanical level gauge (float type) on side of tank for at-a-glance monitoring

OPTIONS

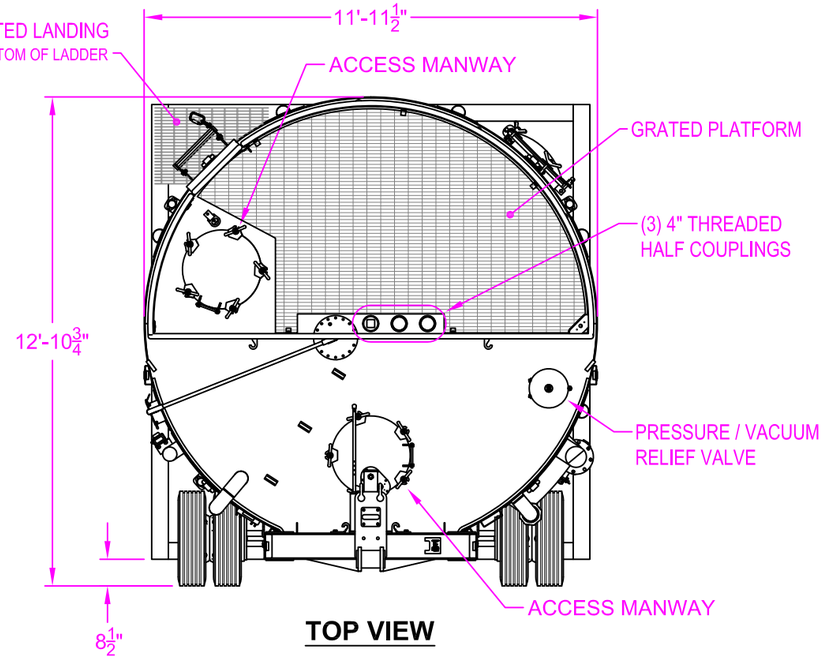
- » Digital radar level gauge
- » Electronic high/high level alarm system with strobe lights



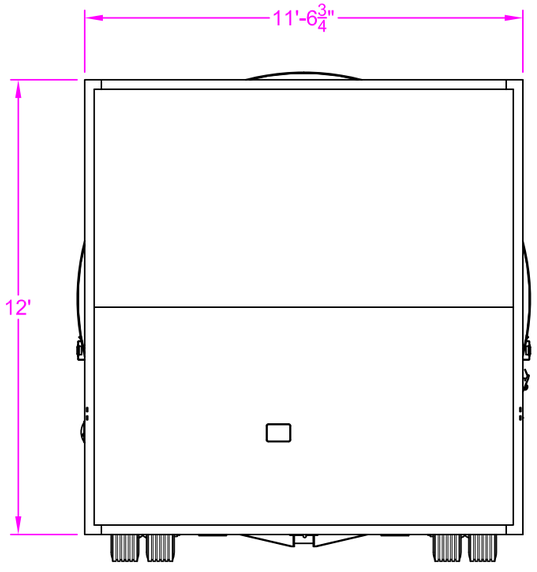
LEFT SIDE VIEW
(DRIVERS SIDE)



RIGHT SIDE VIEW
(PASSENGER SIDE)



TOP VIEW



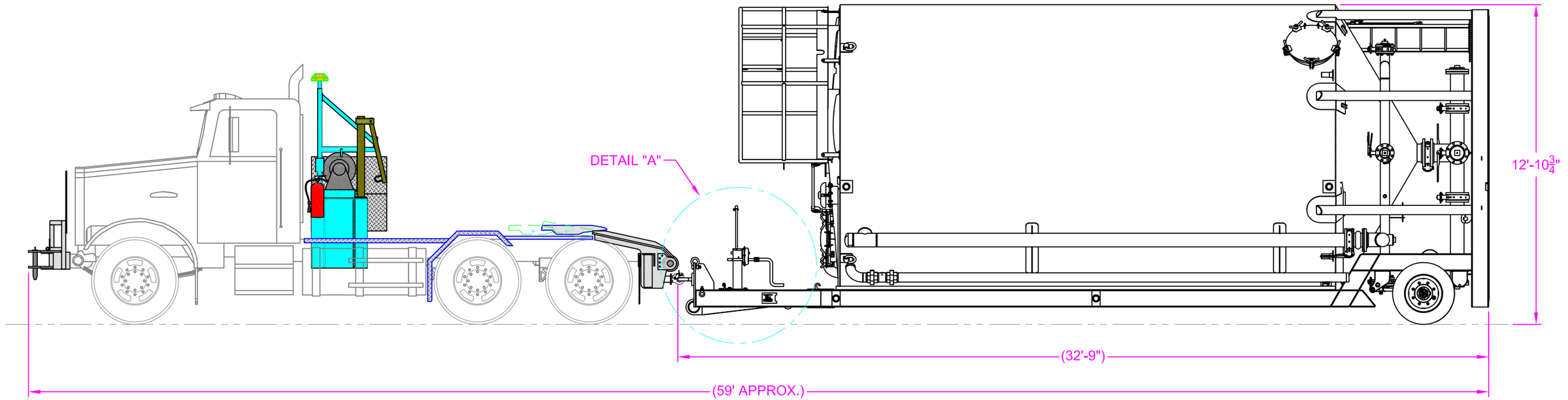
BOTTOM VIEW

NOTES:
1. MAX CAPACITY: 420 BBL (17,600 GALLONS)
2. DRY WEIGHT: 22,500 LBS.
3. MATERIAL: CARBON STEEL

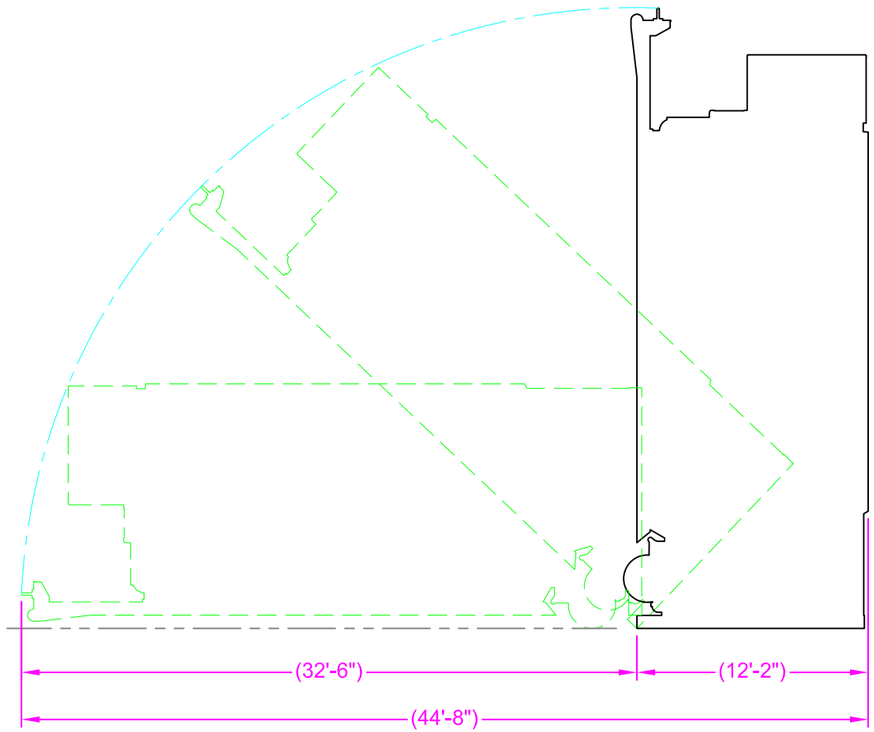
BAKERCORP™ 3020 OLD RANCH PARKWAY
SEAL BEACH, CA 90740-2751

TITLE: **420 BBL UPRIGHT CONE BOTTOM TANK**
GENERAL LAYOUT & DIMENSIONS

SHEET SIZE: B 11" x 17"	MATERIAL:	CUSTOMER: BAKER CORP - SEAL BEACH, CA		BRANCH: CORP	
	FINISH:	DWG BY: J. GONZALEZ	DATE: 02-23-14	SCALE: 1/4" = 1'	SHEET: 1 OF: 2
		CKD BY: DAN HALL	DATE: 02-23-14	DWG No: **SKM0201**	REV: A

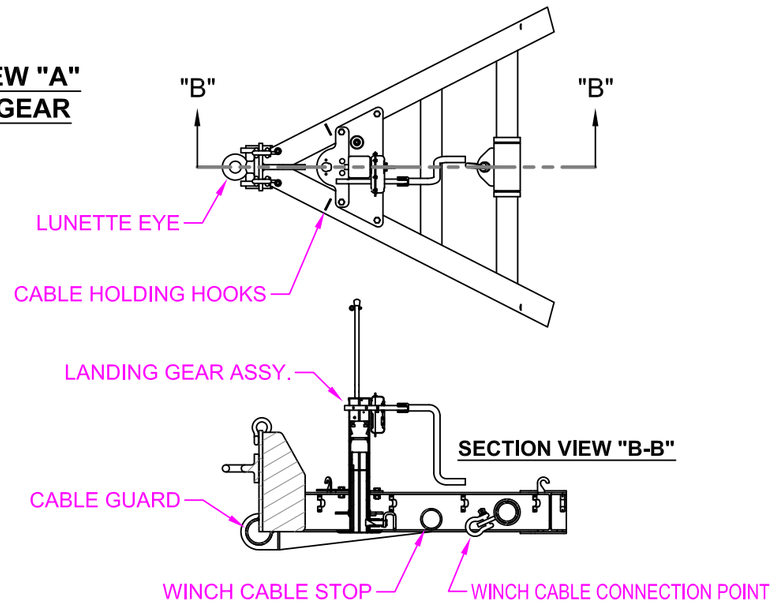


TRACTOR TRUCK AND TANK GENERAL LAYOUT



GENERAL LAYOUT AND TILTING DETAIL

DETAIL VIEW "A" LANDING GEAR



BAKERCORP™ 3020 OLD RANCH PARKWAY SEAL BEACH, CA 90740-2751

TITLE: **420 BBL UPRIGHT CONE BOTTOM TANK**
GENERAL LAYOUT & DIMENSIONS

SHEET SIZE: B 11" x 17"	MATERIAL:	CUSTOMER: BAKER CORP - SEAL BEACH, CA			BRANCH: CORP
	FINISH:	DWG BY: J. GONZALEZ	DATE: 02-23-14	SCALE: -	SHEET: 2 OF: 2
		CKD BY: DAN HALL	DATE: 02-23-14	DWG No: SKM0201	REV: A

GEOSTRUX™

GEOTEXTILE TUBES

ENVIRONMENTALLY PROVEN SOLUTIONS FOR DEWATERING AND COASTAL APPLICATIONS

GEOSTRUX™ Tubes are produced using high strength woven fabrics which are manufactured to exacting standards by our in-house fabrication group.

Once on site, GEOSTRUX™ Tubes are hydraulically filled with heavily saturated sediment, sand or waste materials. When fully dewatered, the sediment has reduced weight and volume, allowing for more cost-effective material handling. In coastal applications the structure is strategically placed before filling to provide cost effective shoreline protection or habitat creation.

GEO-SYNTHETICS, LLC.

WWW.GEO-SYNTHETICS.COM

PHONE: 800.444.5523

GEOSTRUX@GEO-SYNTHETICS.COM

GEOSTRUX™

GEOTEXTILE TUBES

FIELD PROVEN IN A WIDE VARIETY OF APPLICATIONS

APPLICATIONS

- Habitat Creation
- Coastal Protection
- Breakwaters, Groins & Jetties
- Dewatering Liquid Waste and Sludge
- Dewatering Lake and River Sediments

ADVANTAGES

- Cost Effective
- Passive Dewatering
- Improved Effluent Clarity

GEOSTRUX™ Geotextile Tube

Dimensions and Capacities

Circumference	Capacity*
22.5'**	1.3 CY/LF
30'	2.3 CY/LF
45'	4.1 CY/LF
60'	6.2 CY/LF
75'	8.3 CY/LF
90'	10.1 CY/LF

**Calculated volume – Actual capacity may vary*

***Container Tubes*

Available in either black or tan fabric

Note: Dimensions and capacities are represented as typical values. They should not be used for design purposes. GSI makes no warranties and assumes no liability in connection with the use of this information.

GSI GEO-SYNTHETICS, LLC.

WWW.GEO-SYNTHETICS.COM PHONE: 800.444.5523 GEOSTRUX@GEO-SYNTHETICS.COM

ATTACHMENT F DNR Guidelines, equipment and materials specifications

Turbidity Barrier
(1069)

Wisconsin Department of Natural Resources
Conservation Practice Standard

I. Definition

A temporary fabric barrier with very low permeability, installed in or near the bed of a waterway or waterbody to minimize sediment transport and is installed parallel to flow. Turbidity barrier cannot be installed perpendicular to a moving channel.

II. Purposes

The purpose of this practice is to provide sediment containment while construction activities are occurring in or directly adjacent to a waterway or waterbody.

III. Conditions Where Practice Applies

This practice applies where construction activities intrude or are directly adjacent to a waterway or waterbody. This includes but is not limited to bridge construction, rip rap placement, utility work, streambank restoration, boat launches and dredging.

Use turbidity barriers in conditions with fine soils and flow velocities not exceeding 5 feet per second, unless additional reinforcement is installed.

IV. Federal, State, and Local Laws

Users of this standard shall be aware of applicable federal, state, and local laws, rules, regulations, or permit requirements governing the use and placement of turbidity barriers. This standard does not contain the text of federal, state, or local laws.

V. Criteria

This section establishes the minimum standards for design, installation and performance requirements.

A. **Installation –** Details of construction not listed in the text shall conform to the pertinent requirements of Figures 1 and 2.

1. The barrier shall be installed before construction activities are initiated in, or adjacent to the waterway or waterbody. Install the turbidity barrier as close to the construction as practical. The barrier shall remain in place and be maintained until the construction activity is completed and the disturbed area *stabilized* [1].

2. The ends of the barrier shall be securely anchored and keyed into the shoreline to fully enclose the area where sediment may enter the water.

3. Driven steel posts shall be used to hold the barrier in position. The maximum spacing between posts shall be 10 feet. When barrier height exceeds 8 feet, post spacing may need to be decreased.

   When bedrock prevents the installation of posts, float devices may be used. Flotation devices shall be flexible, buoyant units contained in an individual flotation sleeve or collar attached to the turbidity barrier. Use solid expanded polystyrene logs or equivalent having a 49 square inch minimum end area. Do not use polystyrene beads or chips. Buoyancy provided by the flotation devices shall be sufficient to support the weight of the turbidity barrier and maintain a freeboard of at least three inches above the water surface. Refer to Figure 1.

4. The barrier and steel posts shall extend from the bottom of the waterway or waterbody to an elevation 2 feet above the anticipated high water level during the time of year and duration the barrier will be in place. The elevation shall not exceed the top of bank.

5. Ballast shall be used to hold the barrier in a vertical position. Bottom load lines shall consist of a chain incorporated into the bottom hem of the screen, of sufficient weight to serve as ballast to hold the screen in a vertical position. Additional anchorage shall be provided if necessary.

[1] Words in the standard that are shown in italics are described in X. Definitions. The words are italicized the first time they are used in the text.

6. Danger buoys shall be used as directed by the Coast Guard or DNR permit when working in navigable waters.

7. Turbidity barriers shall be installed parallel to the direction of flow and shall not be installed across channels.

B. **Material**

1. Reusable components of the turbidity barrier system shall be clean and free of potential exotic species. Fabric cannot be reused.

2. Top load lines shall consist of 5/16 inch steel cable.

3. Fabric shall be selected according to the specifications in Table 1.

Table 1

Requirement	Method	Value
Min. grab tensile strength	ASTM D 4632	200 lb (890 N)
Min. puncture strength	ASTM D 4833	90 lb (400 N)
Maximum permeability	ASTM D 4491	$\leq 1X10^{-7}$ cm/s
Min. ultraviolet stability	ASTM D 4355	70%

Source: WisDOT Spec 628.2.10.

VI. Considerations

A. The 5 feet per second flow velocity specified in Section III can be the base flow of the stream or the base flow plus the addition of storm event runoff. Base flow can be used alone for short term projects (typically one day duration, i.e. culvert installation) when the chance of precipitation is low. Longer term projects (i.e. bridge work) should consider storm flow in addition to base flow (typically the two year event).

B. If the current exceeds 5 feet per second, other methods to divert flow away from the turbidity barrier such as temporary concrete traffic barriers, coffer dams, pumping, or sheet piling should be considered.

C. Sediment that has been settled out by the turbidity barrier should only be removed if so directed by the regulatory authority because re-suspension of sediment will likely occur during the removal process. Use of polymers may help prevent resuspension of sediment. See WDNR Technical Standard 1051 Sediment Control Water Application of Polymers for further guidance.

D. Turbidity barriers are meant to manage sediment in the waterbody. The best way to prevent sediment from entering the waterbody is through the implementation of effective upland erosion control, stopping sediment transport at its source.

E. Turbidity barriers should not be used to reduce the conveyance capacity of the channel. An example is use on bridge projects where the turbidity barrier is installed adjacent to each abutment simultaneously.

F. Turbidity barriers may be installed on the banks of a waterway or waterbody if higher water levels are anticipated during construction.

VII. Plans and Specifications

Plans and specifications for installing a turbidity barrier shall be in keeping with this standard and attached detail drawing and shall describe the requirements for applying the practice to achieve its intended purpose:

A. Location of turbidity barrier.

B. Material specification conforming to standard.

C. All plans, standard detail drawings, or specifications shall include schedule sequence or notes for installation, inspection, and maintenance. The responsible party shall be identified.

VIII. Operation and Maintenance

A. Turbidity barriers shall be inspected daily and repaired if necessary.

B. Turbidity barriers shall not be removed until the water behind the barrier has equal or greater clarity than the waterway or waterbody.

C. Care shall be taken when removing the barrier to minimize the release or re-suspension of accumulated sediment.

D. To prevent the spread of exotic species turbidity barriers shall not be reused on other sites. Buoys

and chains can be reused but shall be either disinfected with vinegar or cleaned with hot water greater than 104 deg. F then allowed to completely dry for a minimum period of five days. If there are any questions about the occurrence of zebra mussels, Eurasian water-milfoil, or other aquatic invasive species in a waterbody that you are working in, or intend to work in, contact your local DNR staff.

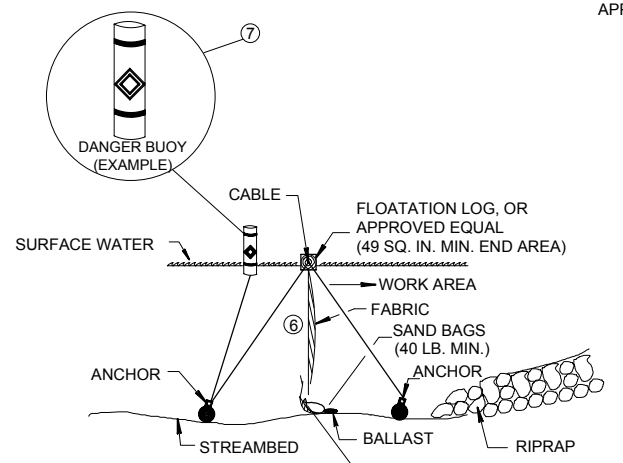
IX. References

WisDOT Facilities Development Manual: Chapter 10, Section 10, Subject 45, Turbidity Barrier

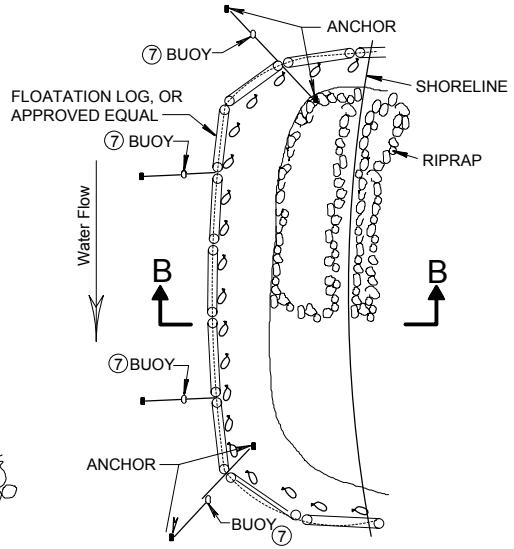
X. Definitions

Stabilized (V.A.1): Means that all land disturbing construction activities at the construction site have been completed, and that a uniform perennial vegetative cover has been established with a density of at least 70% of the cover for the unpaved areas and areas not covered by permanent structures, or that employ equivalent stabilization measures.

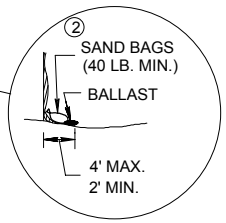
Figure 1. Turbidity Barrier Placement Details

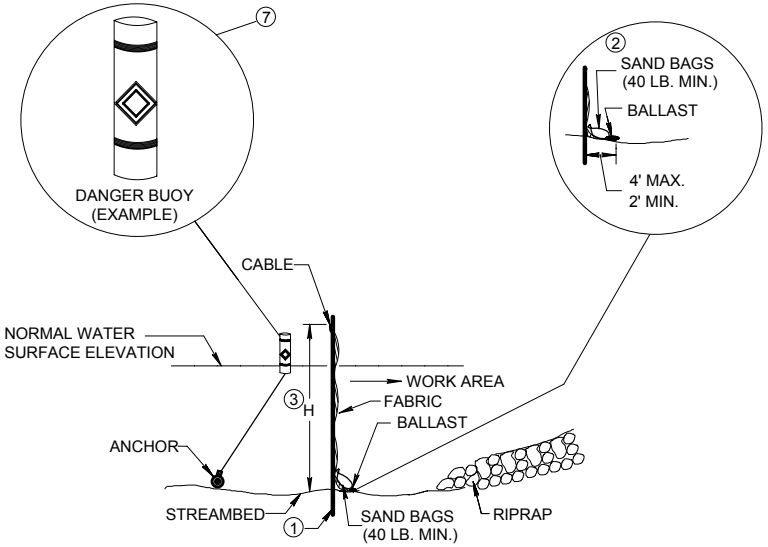


SECTION B-B

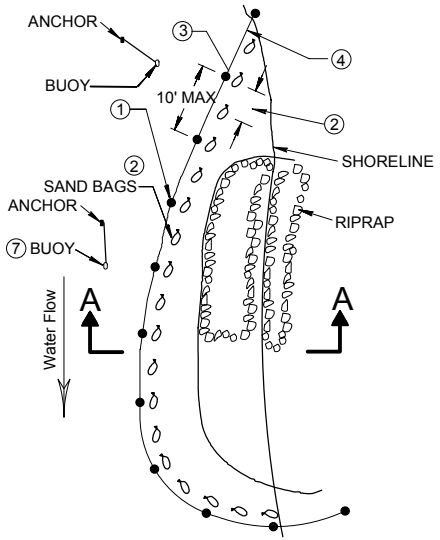


TURBIDITY BARRIER FLOAT ALTERNATIVE
CAUTION - SEE NOTE 5





SECTION A-A



PLAN VIEW

TURBIDITY BARRIER STANDARD POST INSTALLATION

GENERAL NOTES

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD AND THE APPLICABLE SPECIAL PROVISIONS

TURBIDITY BARRIER MAY BE REMOVED AT THE ENGINEERS OR PROJECT MANAGERS DISCRETION, WHEN PERMANENT EROSION CONTROL MEASURES HAVE BEEN ESTABLISHED.

① DRIVEN STEEL POSTS, PIPES, OR CHANNELS. LENGTH SHALL BE SUFFICIENT TO SECURELY SUPPORT BARRIER AT HIGH WATER ELEVATIONS.

② SANDBAGS TO BE USED AS ADDITIONAL BALLAST WHEN ORDERED BY THE ENGINEER OR PROJECT MANAGER TO MEET ADVERSE FIELD CONDITIONS. SPACE AS APPROPRIATE FOR SITE CONDITIONS.

③ WHEN BARRIER HEIGHT, H, EXCEEDS 8 FT., POST SPACING MAY NEED TO BE DECREASED.

④ IN WATERWAYS SUBJECT TO FLUCTUATING WATER ELEVATIONS, PROVISIONS SHOULD BE MADE TO ALLOW THE WATER TO EQUALIZE ON EACH SIDE OF THE BARRIER. THIS MAY BE ACCOMPLISHED BY LEAVING A PORTION OF THE BARRIER OPEN ON THE UPSTREAM END.

⑤ FLOAT ALTERNATIVE WILL ONLY BE ALLOWED WITH WRITTEN APPROVAL OF THE ENGINEER OR PROJECT MANAGER, AND IS MEANT FOR LOCATIONS WHERE BED ROCK PREVENTS THE INSTALLATION OF POSTS.

⑥ ALLOW SUFFICIENT SLACK VERTICALLY AND HORIZONTALLY SO THAT SEDIMENT BUILD UP WILL NOT SEPARATE OR LOWER THE TURBIDITY BARRIER.

⑦ USE AS DIRECTED BY COAST GUARD OR DNR PERMIT WHEN WORKING IN NAVIGABLE WATERWAYS.

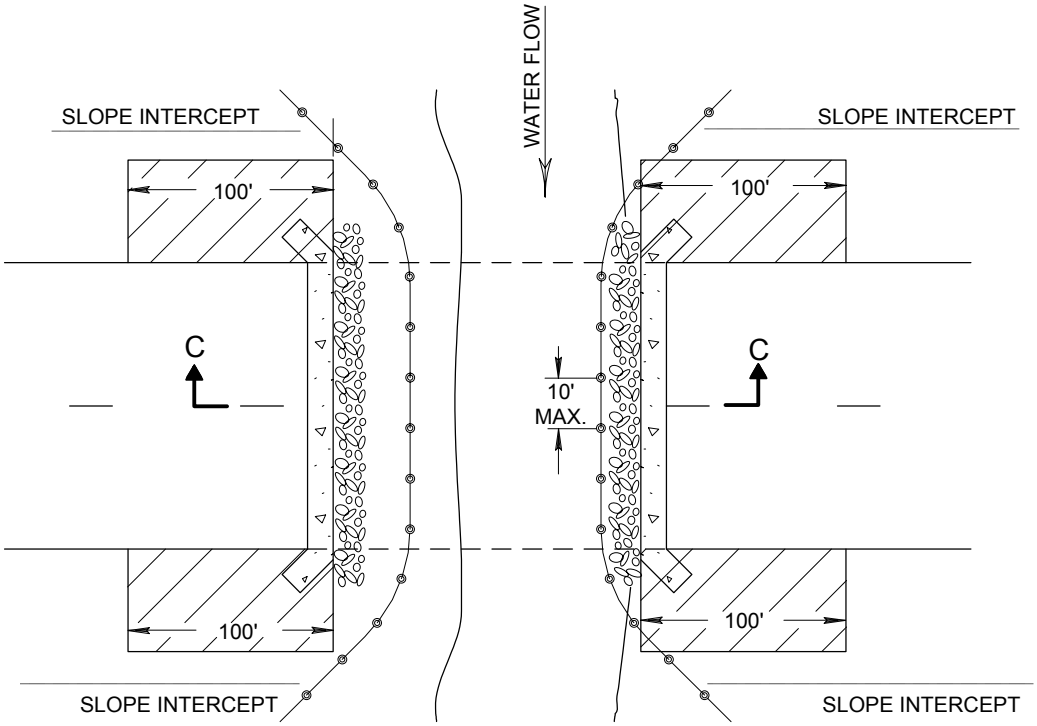
NOT TO SCALE

This drawing based on Wisconsin Department of Transportation Standard Detail Drawing 8 E 11-2.

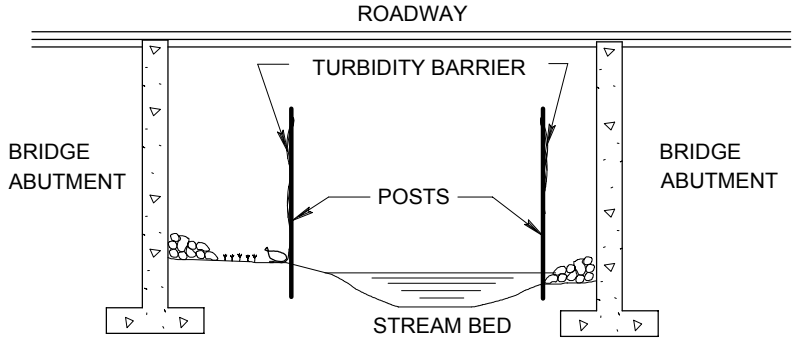
FIGURE 2. TURBIDITY BARRIER DETAIL SHOWING TYPICAL PLACEMENT AT STRUCTURES

GENERAL NOTE

FLOAT ALTERNATIVE WILL ONLY BE ALLOWED WITH WRITTEN APPROVAL OF THE ENGINEER OR PROJECT MANAGER AND IS MEANT FOR LOCATIONS WHERE BEDROCK PREVENTS THE INSTALLATION OF POSTS.



PLAN VIEW



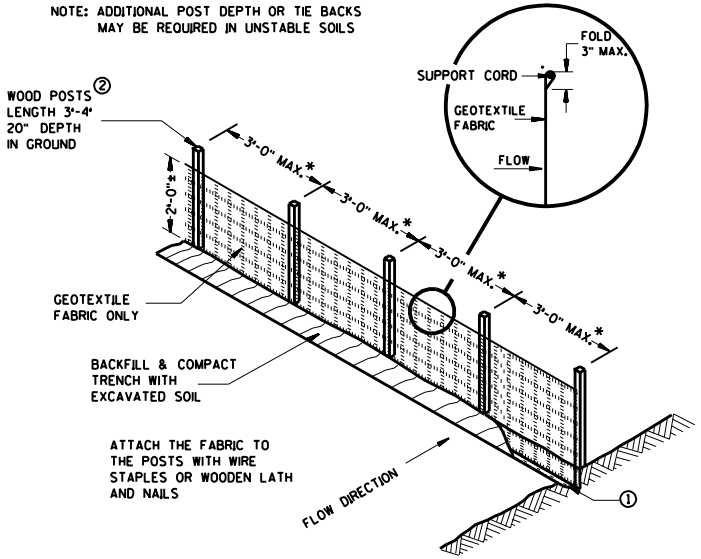
SECTION C-C

NOT TO SCALE

This Drawing is Based on Wisconsin Department of Transportation Standard Detail Drawing 8 E 11-2.

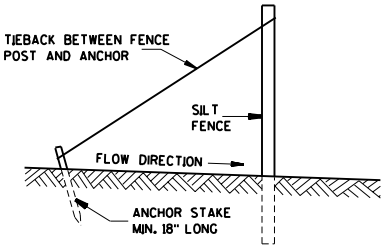
GENERAL NOTES

1. TRENCH SHALL BE A MINIMUM OF 4" WIDE & 6" DEEP TO BURY AND ANCHOR THE GEOTEXTILE FABRIC. FOLD MATERIAL TO FIT TRENCH AND BACKFILL & COMPACT TRENCH WITH EXCAVATED SOIL.
2. WOOD POSTS SHALL BE A MINIMUM SIZE OF 1⅛" X 1⅛" OF OAK OR HICKORY.
3. CONSTRUCT SILT FENCE FROM A CONTINUOUS ROLL IF POSSIBLE BY CUTTING LENGTHS TO AVOID JOINTS. IF A JOINT IS NECESSARY USE ONE OF THE FOLLOWING TWO METHODS: A) TWIST METHOD -- OVERLAP THE END POSTS AND TWIST, OR ROTATE, AT LEAST 180 DEGREES. B) HOOK METHOD -- HOOK THE END OF EACH SILT FENCE LENGTH.

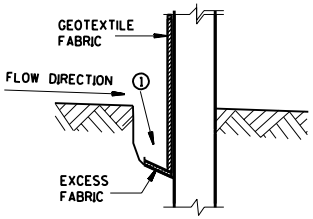


*NOTE: 8'-0" POST SPACING ALLOWED IF A WOVEN GEOTEXTILE FABRIC IS USED.

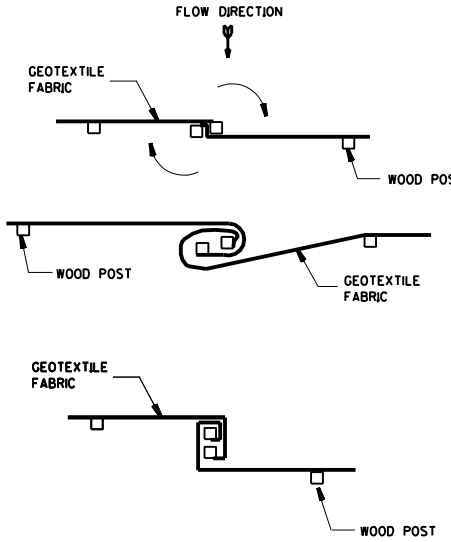
SILT FENCE



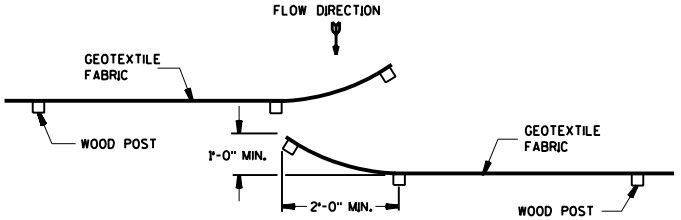
SILT FENCE TIE BACK
(WHEN ADDITIONAL SUPPORT REQUIRED)



TRENCH DETAIL



TWIST METHOD



HOOK METHOD

JOINING TWO LENGTHS OF SILT FENCE ④

This drawing based on Wisconsin Department of Transportation Standard Detail Drawing 8 E 9-6.

SILT FENCE

Section 606 Riprap

606.1 Description

(1) This section describes furnishing and placing riprap.

606.2 Materials

606.2.1 Riprap Stone

(1) Furnish durable field or quarry stone that is sound, hard, dense, resistant to the action of air and water, and free of seams, cracks, or other structural defects. Use stone pieces with a length and width no more than twice the thickness. Do not place material without the engineer's approval of the stone quality, size, and shape.

(2) The department will determine the average dimension of stone pieces by averaging measurements of thickness, width, and length. Furnish stones conforming to the size requirements for the riprap grade the plans show. Size requirements are expressed as the percent of the gross in-place riprap volume occupied by stones within average dimension size ranges for each riprap grade as follows:

AVERAGE DIMENSION RANGES FOR EACH RIPRAP GRADE				FRACTION OF GROSS
LIGHT RIPRAP	MEDIUM RIPRAP	HEAVY RIPRAP	EXTRA-HEAVY RIPRAP	IN-PLACE RIPRAP VOLUME OCCUPIED
inches	inches	inches	inches	BY STONES
>16	>20	>25	>30	0%
11 - 13	14 - 16	18 - 20	22 - 25	10% - 14%
9 - 11	11 - 14	14 - 18	18 - 22	15% - 21%
4 - 9	5 - 11	6.5 - 14	8 - 18	20% - 28%
<4	<5	<6.5	<8	5% - 7%
<1	<1	<1	<1	2% or less

(3) The contractor may substitute waste concrete slabs for stone. Furnish sound concrete, free of protruding reinforcement, and conforming to the size requirements specified for stone.

606.2.2 Riprap Grout

(1) Furnish an air-entrained mortar or concrete to fill the voids between riprap stones in grouted riprap. Conform to the physical requirements for component materials as specified in 501.2 except furnish fine aggregate or a combination of fine and coarse aggregate with a gradation that results in a grout with a consistency that allows complete filling of the riprap voids.

(2) Certify that the grout conforms to the following mixture requirements:

- Contains 470 pounds or more of portland cement per cubic yard of grout. The contractor may substitute class C fly ash for up to 30% of the required portland cement.
- Contains only enough water to achieve a 3-inch slump. Any additional workability required to completely fill the riprap voids must be achieved with admixture without increasing the w/cm ratio.
- Contains 9% or more air for mixes with a nominal top size aggregate less than 3/8 inch or 7% or more air for a mix with 3/8 inch or larger aggregate.

606.3 Construction

606.3.1 General

(1) Prepare the bed for the riprap by excavating, shaping the slopes, and constructing the toe for riprap installation. After placing the riprap, restore the surface of adjacent work and dispose of surplus material.

606.3.2 Placing Light Riprap

(1) If laying stone above the waterline, place it by hand. Lay it with close, broken joints and firmly bed it in the slope and against the adjoining stones. Lay the stones perpendicular to the slope with ends in contact. Compact the riprap thoroughly as construction progresses. Make the finished surface even and tight. Place larger stone in lower courses. Chink spaces between stones by firmly ramming spalls into place. If placing riprap over geotextile, use type R and conform to 645.3.1.6.

(2) Unless specified otherwise, make riprap at least one foot thick, measured perpendicular to the slope.

(3) Do not place riprap against, or in contact with, concrete surface before the end of the concrete’s curing and protection period.

606.3.3 Placing Medium, Heavy, and Extra-Heavy Riprap

(1) The contractor may place medium, heavy, and extra-heavy riprap by any mechanical means that produce a completed job within reasonable tolerances of the typical section the plans show. Limit

handwork to the quantity necessary to fill large voids or to correct segregated areas. If placing riprap over geotextile, use type HR and conform to 645.3.1.7.

(2) Unless specified otherwise, make medium riprap at least 18 inches thick, heavy riprap at least 24 inches thick, and extra-heavy riprap at least 30 inches thick.

606.3.4 Placing Grouted Riprap

(1) If the plans specify using grouted riprap, lay the stone as specified above under 606.3.2 or 606.3.3. Fill the spaces between the stones with cement mortar. Use sufficient mortar or concrete to completely fill voids, except leave the face surface of the stone exposed.

(2) Place grout from the bottom to the top and then sweep the surface with a stiff broom. After completing the grouting, cure the surface as specified in 415.3.12 except substitute type 1-D curing compound as specified for structures in 502.2.6. During cold weather, protect the concrete as specified in 415.3.13 for concrete pavement.

606.4 Measurement

(1) The department will measure the bid items under this section by the cubic yard acceptably completed, measured as the volume within the limiting dimensions the contract designates or the engineer establishes in the field.

606.5 Payment

(1) The department will pay for measured quantities at the contract unit price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
606.0100	Riprap Light	CY
606.0200	Riprap Medium	CY
606.0300	Riprap Heavy	CY
606.0400	Riprap Extra-Heavy	CY
606.0500	Grouted Riprap Light	CY
606.0600	Grouted Riprap Medium	CY
606.0700	Grouted Riprap Heavy	CY
606.0800	Grouted Riprap Extra-Heavy	CY

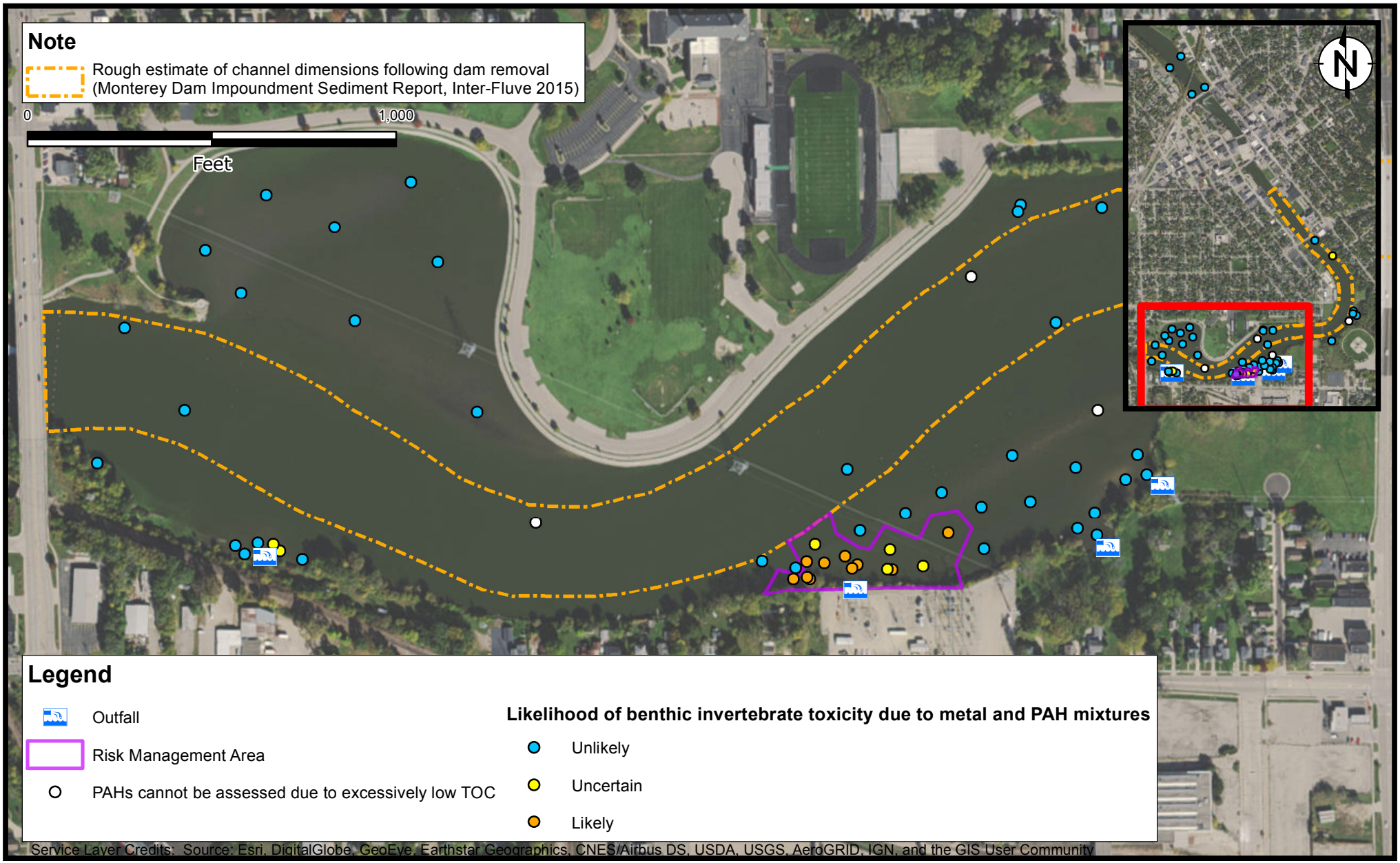
(2) Payment for the bid items under this section is full compensation for preparing the bed, providing and placing riprap, restoring adjacent work, and disposing of surplus material. The department will pay for excavation in excess of the approximate volume of earth occupied by the riprap under the Excavation Common bid item as specified under 205.5.

(3) Payment for the Grouted Riprap bid items also includes placing and curing mortar.

ATTACHMENT **G**

Tables and Figures (from GHD RRIR, 2017, *included for convenience*)

Fig. 5.11 *Spatial Distribution of Metal-PAH Mixtures and Toxicity Predictions*
Fig 6.1 *Sediment area for potential remedial action*



RAMBOLL ENVIRON

Spatial Distribution of Metal-PAH Mixtures and Toxicity Predictions for Surface Sediments

Rock River (RM 178.5 to 180.5), Janesville, Wisconsin

FIGURE **5.11**

DRAFTED BY: RD | DATE: 4/25/2017 | PROJECT: 0227748A

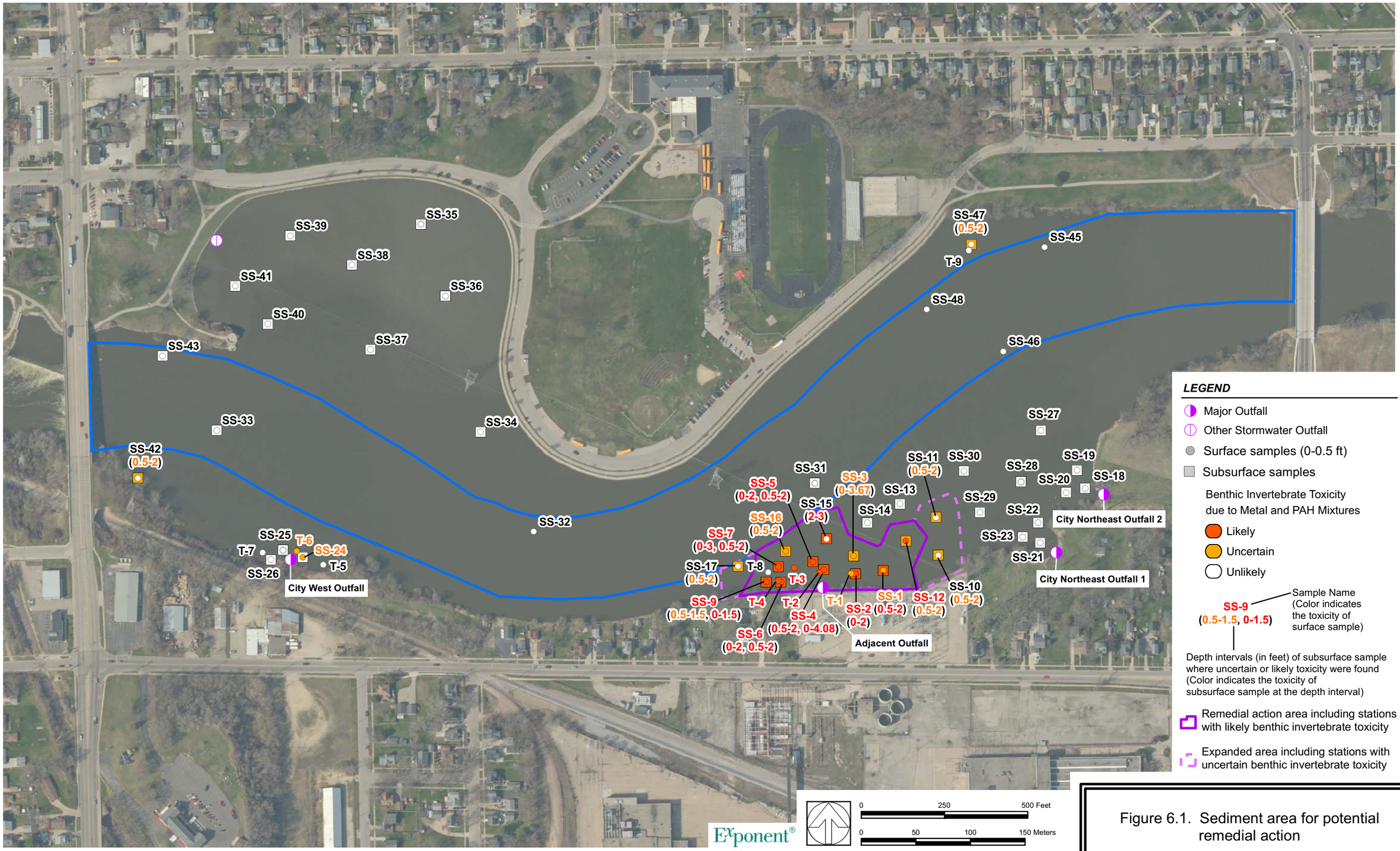


Figure 6.1. Sediment area for potential remedial action

ATTACHMENT H Wisconsin Admin Code NR718 Exemption Request and Soil Management Plan