Avon Lake Board of Municipal Utilities

WORK SESSION

AGENDA

For

Tuesday

February 3, 2026

6:00 PM

1. Call to Order
2. HDR Contract Amendment
3. Adjourn

Avon Lake Regional Water

MEMORANDUM

To: **Board of Municipal Utilities**

From: **Rob Munro**

Subject: **Work Session Agenda Items – February 3, 2026**

Date: **January 30, 2026**

Item 1: **Call to Order**

Item 2: **HDR Contract Amendment** – *RKM*

Staff and representatives from HDR will present a proposed contract amendment for additional design services at the Water Filtration Plant.

Item 3: **Adjourn**

SCOPE OF SERVICES

REDUNDANCY AND FUTURE CAPACITY PLAN

AMENDMENT #7

February 2026

The Scope of Services set forth herein defines the work to be performed by HDR. Both Avon Lake Regional Water (ALRW) and HDR have attempted to clearly define the work to be performed and address the needs of the Project.

This document includes the addition of a new task – Water Filtration Plant (WFP) Expansion, hereafter referred to WFP Expansion.

SERVICES TO BE PERFORMED

Tasks 1-5. Various Tasks

- N/A

Task 6. Eastern Transmission Lines (ETLs) Replacement

- N/A

Task 7. WFP Improvements

- N/A

Task 8. OSG System Design

- N/A

Task 9. WFP Expansion Design

The following is added to the scope of services:

- WFP Expansion:
  - Planning of Improvements to Increase Capacity from 50 MGD to 75 MGD
    - Improvements to be completed in two phases* –
      - Phase 1: 50 MGD to 62 MGD
      - Phase 2: 62 MGD to 75 MGD
  - Design of Phase 1 Improvements
  - Design of Phase 2 Improvements

* It is assumed that one of the two phases will include a new raw water intake and pump station, and separately, a large diameter transmission main from the WFP to the Miller Road Pump Station (suction pipeline).

TIME OF PERFORMANCE

The following is added to the schedule and deliverables:

Task 9. WFP Expansion – 13 months, NTP expected 02/05/2026; exact schedule/timeline to completion dependent on agency review times for permit applications, which are described below.

Final Deliverables:

- Construction Bid Documents
  - Sealed Drawings
  - Technical Specifications
- Final Opinion of Probable Construction Cost (OPCC)

The following is added to the scope description:

Task 9. WFP Expansion

ALRW is in the process of implementing improvements to their 50 MGD WFP, for which HDR is the Engineer of Record (EOR) and is providing ongoing construction management and inspection services. The improvements include the addition of four new filters and replacement of several chemical systems including alum, lime, and chlorine, and is a priority project for ALRW – to replace aging infrastructure and improve resiliency/operability of the facilities. Concurrently, ALRW is wrapping up a master planning exercise to define future, utility-wide improvements needed to accommodate residential growth and potential rapid industrial growth at the Lorain County Regional Airport site. These improvements include an expansion of the WFP, in phases, increasing capacity to 112 MGD by 2060. The first two phases of expansion would increase capacity to 75 MGD, and the timing of each phase would depend on how quickly new industrial users are established.

Under this scope of services, HDR will work closely with ALRW to implement this WFP Expansion task, increasing capacity from 50 MGD to 75 MGD in two phases. This task will be delineated into the following sub-tasks:

1. Sub-Task 1. Planning
2. Sub-Task 2. Field Investigations
3. Sub-Task 3. Preliminary Design
4. Sub-Task 3. Detailed Design

9.1. Planning

9.1.1. Kickoff Meeting

The HDR Team will conduct a two-hour, in-person task Kickoff Meeting with ALRW staff to:

1. Provide an introduction to key delivery team members.
2. Review tasks logistics and management activities, including lines of communication and proposed detailed schedule.
3. Review task requirements, such as scope, schedule, and budget.
4. Review the final recommendations in the final Master Plan report.
5. Discuss critical task success factors.
6. Brainstorm task risks.

9.1.2. Data Gathering

The objective of this subtask is to obtain general information on the existing WFP facilities, on properties that have recently been purchased, or are in the process of being acquired, by ALRW, for expansion of the WFP facilities beyond the existing site, and on lands/buildings between the WFP and Miller Road Pump Station, which will be used to inform the design process. For the existing WFP, the HDR Team will provide a high-level evaluation of existing processes and facilities not previously considered under the ongoing Improvements project. These include the raw water pump station, high service pump stations, clearwells, filter backwash storage tank, and the flocculation and sedimentation basins and pipe galleries.

Under this subtask, HDR will:

1. Coordinate with the ALRW to confirm water system demands, pressures, and water quality summarized in the draft Master Plan (dated March 12, 2025).
2. Review general location and capacity of power utilities, as well as the generators.
3. Obtain and research existing street plans, utility plans, drainage plans, plats, right-of-way (ROW) maps, existing easement information, contour maps, and other features within and pertaining to the potentially impacted area. Research planned and future developments between the WFP and Miller Road Pump Station to determine how the new transmission main may impact any future development.
4. Perform site visit(s) to obtain necessary information/confirm information obtained from other sources. Document the information using digital photography and/or video.
5. Develop a list of additional requested documents for submittal to the ALRW.

9.1.2 Assumptions

1. ALRW has already provided HDR with all record drawings and specifications that are available for the existing WFP facilities and utilities.

9.1.3. Existing Conditions Assessment and Code Compliance Review

The HDR Team will conduct a high-level condition assessment of the WFP to enhance what has already been prepared and learned under the ongoing Improvements project. In particular, the focus will be in areas where greater information is needed to support design efforts, particularly the raw water pump station, high service pump stations, clearwells, filter backwash storage tank, and the flocculation and sedimentation basins and pipe galleries. HDR will also assess conditions at points of connection (tie-ins) needed for the incorporation of new facilities. This assessment will be based on what is observed only; no intrusive investigations are included in the base scope.

HDR will work with WFP staff to identify valves which will need to be relied upon during construction, particularly for tie-ins, cut-overs and final commissioning. The goal is to reduce the potential for field condition construction contract changes orders, to verify they will work when needed. Valves and other equipment which will be relied upon for construction sequencing will be tested/operated during this preliminary design period, to provide a level of confirmation that it can be relied upon to operate reliably during construction. If found inoperable, improvements to rehabilitate or replace that equipment will be incorporated into the design, for implementation early during construction. This will be integrated into the Maintenance of Plant Operations (MOPO) Plan developed in subtask 9.1.7.

A code compliance review will also be conducted for the areas identified above. HDR's determination will be based on a review of regulatory codes and standards and will identify deficiencies and proposed resolution to each.

9.1.3 Assumptions

1. WFP staff will operate valves and other equipment which will require testing.
2. Code compliance review will utilize the latest versions of the Ohio Building and Construction Codes (i.e., Building, Electrical, Fire, Mechanical, Plumbing, etc.) in effect at the time of the evaluation; assumed to be the 2024 Ohio Building Code (based on the 2021 International Building Code) and 2020 Electrical Code.
3. Additional, non-destructive tests to assess the condition of existing facilities and equipment can be provided as a supplemental service.

9.1.3 Key Deliverables

1. Draft and final Technical Memorandum summarizing findings from the code compliance review

9.1.4. Intake Source Water Resiliency Evaluation

Recent years have seen some of the most rapid fluctuations in the recorded history of Great Lakes water levels. Water levels in Lake Erie have historically fluctuated based on both seasonal and climate conditions in the upstream Great Lakes basin and specifically within the Lake Erie tributary area. Since 1918, Lake Erie's mean water elevation has varied by just over seven feet, ranging from about 567.6 to about 574.3.

ALRW's investment in a new intake and raw water pump station will be significant. Determining the range of Lake Erie water surface elevations upon which to base the intake and raw water pump station design is an important consideration with respect to their proper sizing and performance. Therefore, the impact of both short and long-term climatic changes on the Lake Erie water levels must be considered when siting the intake structure, as well as selecting the depth of the new intake and raw water pump station for reliable delivery to the WFP.

Understanding the impacts of changing Lake levels on the existing raw water pump station is also important, given that its elevations are set. The invert of the existing wetwell is shown to be at elevation 558.0, with the pump suction casing set approximately 3 feet higher (~ elevation 561).

Under this subtask, HDR will perform the following:

- Evaluate historical water levels in Lake Erie (extrapolated to the extent possible) to the vicinity ALRW.
- Review and summarize existing available information regarding potential impacts on Lake Erie water levels given anticipated climatic changes and potential climate projections for a 25, 50 and, 75-year horizon (2050, 2075 and 2100).
    - Use readily available data to develop historical climate and future climate projections of precipitation, temperature, evaporation (closely related to high/low ice years), lake ice and water level in the vicinity of ALRW.

- Utilize an ensemble of 32 Global Climate Model (GCM) outputs for Localized Constructed Analog (LOCA) 4.5 (low emissions future) and LOCA RCP 8.5 (high emissions future) to understand the rate of change over time projected for near, mid and late term.
- Develop proposed raw water intake and pump station hydraulic design criteria related to minimum and maximum anticipated Lake levels over the timelines identified above.
    - Consider the impacts of seiche on Lake Erie water levels.
- Water quality considerations will also be considered when evaluating the location for a new intake structure.

This subtask, as well as subtask 9.1.5, will be highly prioritized so that a design basis for the intake can be developed for timely engagement with the Army Corps of Engineers in a Pre-Application Meeting subtask 9.3.1.

9.1.4 Key Deliverables

1. Draft and final Technical Memorandum summarizing the potential impacts associated with changes in climatic conditions, and identifying design criteria for the 25, 50 and 75-year horizon

9.1.5. Raw Water Pump Station and Intake Alternatives Evaluation, and Workshop #1

Existing Raw Water Pump Station & Intake

The original raw water pump station was constructed in 1960. It has been subsequently expanded and upgraded to its current firm (nominal) capacity of 56.5 MGD. It is fed from two existing intake pipes extending into Lake Erie, a 36” intake and a 54” intake. The existing pump station consists of four 10 MGD pumps, two 6 MGD pumps, one 4.5 MGD pump and a 15 MGD pump. All the pumps are vertical units, located in a single wetwell, with one screen. Firm capacity is based on the largest (15 MGD) pump being out of service. Two of the 10 MGD pumps are variable frequency drive controlled, and the remainder of the pumps are constant speed units.

The draft Master Plan recommends replacing pump #3 (the existing 4.5 MGD pump) with a larger 10 MGD pump to increase the (nominal) firm capacity of the existing station to 62 MGD. It has been recommended that this pump be provided with a variable frequency drive (VFD). There were also some additional evaluations suggested in that draft Plan which are called out separately, below.

Under this subtask, HDR will perform the following scope of services:

- Testing the raw water pumps individually at full (100%) speed to confirm their current capacity on paper (as recommended in the draft Master Plan).
- Evaluate field conditions after the raw water line meter replacement project is completed due to concerns related to flow meter accuracy (as recommended in the draft Master Plan).
- Evaluate adjustments to the flocculation valve(s) to assess potential head losses and flow restrictions related to their current position(s) (as recommended in the draft Master Plan).
- Evaluate the feasibility of replacing the existing 4.5 MGD pump with a 10 MGD pump, from a physical (dimensional) standpoint as well as confirming that the upsized pump station will meet Hydraulic Institute (HI) Standards.

  - Physical or Computational Fluid Dynamics (CFD) modeling will be conducted to assess how the upgraded facilities will perform given the higher flows that will result from upsizing the existing pump.
  - CFD modeling was recommended in the draft Master Plan to provide insights on the wet well suction conditions and hydraulics, and potential impacts on the pumps. HDR believes that physical modeling may be preferred but will evaluate both under this scope. A placeholder cost will be provided to cover either option.
  - Modeling is required to confirm this concept meets HI standards. The modeling may suggest enhancements to the proposed pump #3 replacement to improve performance, such as baffling or floor cones.
- Evaluate impacts on the electrical and controls systems.
- Evaluate the operating performance of the existing and proposed upgraded pump station to determine whether the pumps are and will continue to operate within the Preferred Operating Region (POR) most of the time.
  - The POR is a range, expanded beyond the pump's Best Efficiency Point (BEP) where the pump is designed to operate, both hydraulically and mechanically, at its greatest efficiencies and where hydraulic loads on the rotating assembly are the most balanced. Pumps can operate outside of the POR for certain periods of time but within the Allowable Operating Region (AOR), but that should only occur for short periods of time. The AOR provides a wider operating range, beyond the BEP and POR.
  - This performance evaluation will be performed over the range of design flows and intake level conditions. HDR will review the head losses and velocities in the intake pipes over the range of flows, based on the condition of the intakes as identified in the Master Plan. Impacts on Lake levels due to climate change will also be evaluated, as part of the Resiliency Evaluation subtask 9.1.4.
  - This performance evaluation will also confirm the need for a third VFD to meet the full range of desired pumped flow rates to the WFP over the range of operating level conditions.
- It is assumed that no upgrades to the existing intake are needed, but an inspection can be performed as a supplemental service.

New Raw Water Pump Station & Intake

For capacities greater than the 62 MGD identified for the existing intake and raw water pump station, a new intake and raw water pump station will be required.

HDR will perform the following:

- Identify a site for a new raw water pump station to serve additional treatment units at the WFP (as described below).
- Work with ALRW to confirm the firm build-out capacity for this new pump station at 64 MGD (126 MGD minus 62 MGD).
- Confirm the number of pumps required to meet interim conditions, initially believed to be 13 MGD firm capacity (75 MGD minus 62 MGD), in conjunction with the existing raw water pump station.

  - The impacts of long-term lake level fluctuations due to climate change will also be evaluated, particularly with respect to determining the pump station depth and having sufficient water depth/head over the pump suctions to deliver reliable performance and meet net positive suction head (NPSH) requirements. This is discussed in more detail in Section 9.1.4 of this scope of services.
  - Both circular as well as rectangular configurations will be evaluated. Inter-connection between the two pump stations will be provided, as well as levels of redundancy (n+1 total, or n+1 in each pump station).
  - It is assumed that a building will be provided over the new pump station facility.
- Evaluate interconnection of the raw water pump stations for maximum redundancy.
- The new intake system serving the new raw water pump station will consist of a crib to collect the water and route it into the intake pipe, and the intake pipe, which will route flows from the crib to a shore shaft or junction chamber. From the junction chamber, flows will be routed to the raw water pump station.
  - Using the information from the Resiliency Evaluation subtask 9.1.4, HDR will evaluate and make recommendations for the following:
    - Crib configuration and designs, including screening options
    - Intake pipe size, alignment, depth of cover and materials of construction
    - Intake construction methods

HDR will hold a three-hour, in-person Workshop with ALRW to review the alternatives for upgrading the existing raw water pump station, and for establishing a new raw water pump station and intake, to define the direction for the design effort. Evaluation criteria will be developed as part of the above work, to compare and rank the alternatives, but could include robustness, energy efficiency (pumps), permitting (intake), performance and operational reliability, ability to meet current and future demands, and capital, operational and lifecycle costs.

9.1.5 Key Deliverables:

1. Draft and final Technical Memorandum on existing pump station upgrades
2. Draft and final Technical Memorandum on the new pump station and intake

9.1.6. Large Diameter Transmission Main Alternatives Evaluation, and Workshop #2

The approximately 13,000 feet of pipeline will generally follow from the WFP to the Miller Road Pump Station. Under this subtask, HDR will perform the following scope of services:

- Perform desktop review and field observation (from public access) of available easement and public ROW areas capable of accommodating the pipeline.
- For the general vicinity of the planned transmission main,
  - Perform desktop review of potential environmental impacts.
  - Perform desktop cultural resource review to identify potential archaeological sites.
  - Review existing utilities, future capital improvement projects, and thoroughfare data obtained from public agencies.
- Level D SUE will be conducted.
- Evaluate interconnection options and provide a recommendation.
- Evaluate pipe material alternatives and provide a recommendation.

HDR will also perform a WaterGEMS model validation exercise, initially consisting of a review of the current model, adjustment of demands, as needed, and updates to any major controls or facilities that could have an impact. The goal will be for the model output to be within 5 PSI to 10 PSI of actual pressures. HDR will then run the proposed scenarios (e.g., minimum and maximum head pressures, interconnects) model output to inform the decision making. Systems curves will also be generated to assist with pump selection as part of the 30% design subtask 9.3.5.

As part of the modeling work for the pump station design, HDR will build a transient model in Bently Hammer that includes physical characteristics of the pump, valve, and pipeline systems (i.e., high service pumping at the WFP and the Miller Road PS). Transient simulations will then be conducted for multiple pump shutdown scenarios as follows:

- Power Outage and Pump Shutdown – No additional transient mitigation included.
- Power Outage and Pump Shutdown – Transient mitigation added via a hydropneumatic tank, additional air valves, and/or updated pump controls as needed.
- Normal Operations Shutdown – Evaluate transient conditions when one or more of the pumps shuts down while one or more additional pumps continues running.

Up to three alignment alternatives will be evaluated and recommendations provided for consideration and selection by ALRW. Evaluation criteria and weightings of the criteria will be developed so that each alternative can be compared and ranked. A three-hour, in-person workshop will be conducted with ALRW to present and discuss the alternatives and preliminary scoring matrix, and to define the direction for the design effort. HDR will incorporate changes to the matrix and alignments based on ALRW feedback and summarized in a Technical Memorandum including:

- Preliminary plan views of pipeline alignments (GIS only)
- Interconnection options
- Pipe material selection options
- Proposed crossings/tunnel limits
- Connection locations
- Identify property acquisition needs
- Permitting matrix – identification of various permitting requirements
    - USACOE 404 Permit
    - Environmental permits
    - Utility permits
    - ODOT permits
    - City/County road crossings
    - Archeological and cultural resources permits or reports

9.1.6 Assumptions

1. ALRW's WaterGEMS model will be mostly up-to-date (no major deficiencies) and not require any significant calibration (i.e., more than eight hours of modeling time).
2. The focus of the transient analysis will be from high service pumping at the WFP to the Miller Road Pump Station. Thus, the transient analysis will not consider the entire water distribution system.

9.1.6 Key Deliverables:

1. Draft and final Technical Memorandum

9.1.7. Maintenance of Plant Operations Workshop #3

HDR will schedule a two-hour, in-person MOPO Workshop with ALRW staff. The MOPO Workshop will focus on current operational limitations and planning to allow ALRW to continue the reliable delivery of water to the customers during and beyond construction. From this Workshop a preliminary MOPO Plan will be developed, to be refined as the design progresses. The discussion will also inform the Water Treatment Alternatives Evaluation subtask 9.1.6.

9.1.8. Water Treatment Alternatives Evaluation, and Workshop #4

The draft Master Plan identified the following treatment improvements for Phase 1 of the WFP expansion based on an assessment of component capacity: retrofit sedimentation basins with plate settlers and increase sodium hypochlorite bulk storage. The Plan also concluded that conventional surface water treatment processes are most appropriate for future expansion phases, on the existing site and/or additional (adjacent) properties that have been or are in the process of being purchased by ALRW. It was noted that these could be supplemented with advanced processes (e.g., GAC contactors), as needed, depending on changes to raw water quality and/or regulatory requirements. HDR will not revisit the recommendations made as part of the master planning process but work to further advance the concepts presented with consideration for additional factors beyond capacity alone.

From a capacity standpoint, achieving 75 MGD would require an additional flocculation/ sedimentation train, new filters and finished water storage, and some additional chemical storage. HDR will evaluate various WFP configuration and phasing alternatives, including hydraulic profiles, assuming key evaluation criteria, among others, will be maximizing build-out on the existing site and minimizing disruptions to plant operations. For example, ALRW may want to consider incorporating the additional flocculation/sedimentation train as part of Phase 1 to facilitate retrofit of the existing tankage with plate settlers while maintaining full production.

HDR will also perform the following activities as part of this subtask:

- Evaluate potential raw water quality and/or regulatory changes
    - The draft Plan identified the following contaminants to be further considered in planning an expanded WFP: per- and polyfluoroalkyl substances (PFAS), total organic carbon (TOC) for reducing disinfection by-product (DBP) formation potential, and harmful algal blooms (HABs).
- Evaluate equipment standardization
    - HDR will assist ALRW in identifying opportunities and/or challenges associated with standardizing equipment for various process components. HDR will also review equipment requirements tied to the planned funding [i.e., Buy America, Build America (BABA)].
- Evaluate residuals management
    - ALRW currently discharges settled solids to the nearby Water Reclamation Facility (WRF) where they are thickened and dewatered. ALRW recycles filter backwash to the head of the WFP. HDR will review residuals management strategies for the

expanded WFP, including discussions with WRF personnel. This will inform necessary project components (e.g. equipment, storage, pumping, controls) that may be required to satisfy the preferred strategy and stakeholder requirements.

A three-hour, in-person workshop will be conducted with ALRW to present and discuss the configuration and phasing alternatives and preliminary scoring matrix, as well as additional items identified above, to define the direction for the design effort.

9.1.8 Assumptions

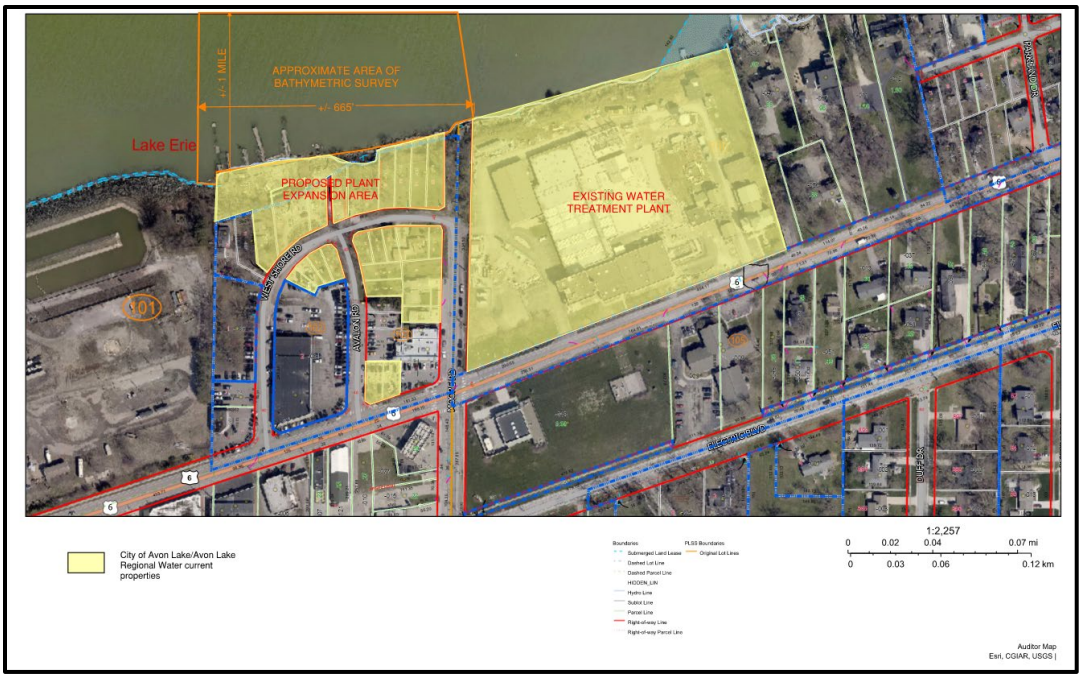
1. Findings from the draft Master Plan will be used as a basis for developing the content of the WFP configuration and phasing alternatives.
2. ALRW will provide available information on the existing WRP residuals management processes (e.g., process model, planning documents, drawings/specifications).

9.2. Field Investigations and Environmental Permitting

Field investigations, described below, will occur concurrent and in coordination with the Preliminary Design subtask 9.3 – to facilitate maintaining the overall task schedule.

9.2.1 Topographic Survey

HDR will engage a survey subconsultant to review any recent survey data provided by ALRW, and, as needed, perform topographic surveys of the area as depicted on the figure below, prior to the ongoing Improvements project being completed and then again post-construction, so that plans are representative of final (current) conditions. Topographic survey along the path of the proposed transmission main from the WFP to the Miller Road Pump Station (routing to be determined) will include an approximately 75-foot-wide corridor. And finally, the subconsultant will perform a bathymetric survey using full-coverage multibeam sonar (with sidescan imaging) and prepare documentation for a submerged land lease for the new intake, as shown in the second figure below; specific length (one mile assumed), location & routing to be determined.



All field and office work will be under the direct supervision of a Registered Professional Surveyor (P.S.) licensed in Ohio.

The following professional surveying and AutoCAD base plan development services shall be provided. The topographic survey shall include mapping of all existing natural or constructed features. Said survey shall include, but not be limited to, the following:

- Locations of structures, pavements, walks and all other permanent improvements.
- Location of existing buildings, on subject property including the ground floor elevations.
- Benchmarks set at the WFP in July 2025 shall be utilized. Additional benchmarks shall be set as needed throughout the task.
- Existing Spot Elevations at intervals necessary to delineate surface elevations.
- Existing onsite utilities as observed in the field or staked by utility owners. Invert information will be gathered where possible.
- Contact OUPS.

An existing conditions base map of the data collected during the topographic survey task will be provided. Said existing conditions map shall include, but not be limited to, the following:

- North Arrow, Scale Bar, Legend, Benchmark Data.
- Detailed Map showing topography area, with spot elevations listed as needed.
- Utility Structure Locations and descriptions with inverts labeled per field location if possible and record information as needed to supplement.
- Depict underground utilities per record drawings (if provided).
- Overhead utility lines.
- Current Zoning information of subject & adjacent properties.
- Ownership of adjacent properties.

Parcel lines will be shown per available County record information. ROW and boundary survey services are included for the path of the transmission main to support preparation of ROW & easement documents (subtask 9.3.5).

9.2.1 Assumptions

1. ALRW will secure necessary permissions for access to properties not currently owned by ALRW.
2. Lake Erie water depths will vary between 6 feet and 40 feet.

9.2.1 Key Deliverables

1. Draft and final Survey Drawings depicting the information obtained from the field work, AutoCAD Civil3D 2020

9.2.2. LiDAR Survey

The HDR Team will conduct a LiDAR Survey of the WFP and impacted WRF facilities that were not scanned as part of the ongoing Improvements project. These include the raw water pump station, high service pump stations, the flocculation and sedimentation basin pipe galleries and the residuals dewatering building at the WRF. The survey will be performed to capture existing conditions for 3D/BIM model development. Preformatted files from the survey will be used as the basis for the Autodesk Revit 3D/BIM models. The survey estimate will include mandatory and optional scanning areas. Data will include color captured point clouds and photographs viewable via proprietary software free of cost. The data will be registered and delivered to ALRW on an external drive.

9.2.2 Assumptions

1. Recent survey data will be available so that the HDR Team can confirm datum changes and actual elevations in the modern datum.
2. During LiDAR scanning, WFP and WRF management will notify the staff and instruct them to avoid scan areas whenever possible.
3. ALRW will remove objects from the space prior to the day of LiDAR scan activity.
4. ALRW will provide free, safe and unencumbered access in and around all interior rooms and equipment for the LiDAR scanning. Restricted and unsafe areas will be identified by signage, caution tape or general walkthrough. Ceiling tiles will not be removed and confined spaces will not be entered.

9.2.2 Key Deliverables

1. LiDAR scan results depicting the information obtained from the field, AutoCAD Revit

9.2.3. Hazardous Materials Survey

The objective of this subtask is to perform a hazardous building material survey of existing WFP and WRF facilities that will be renovated – including the raw water pump station, high service pump stations, the flocculation and sedimentation basin pipe galleries and residuals dewatering building at the WRF. The purpose of this survey is to provide direction for the proper management and disposal of equipment or materials that may contains asbestos, lead based paint, mercury, or other hazardous materials. HDR will engage a hazardous materials assessment and

abatement specialist firm to perform a site assessment and review of existing documentation. The location, quantity, and condition of hazardous materials found will be identified. Furthermore, information on quantities, location, and condition of universal waste that are encountered will be identified. This information will be used to develop specifications to assist the contractor towards the proper management of hazardous materials during construction.

A Hazardous Building Material Survey Report will be prepared, which will include an engineering cost estimate for removing and abating the identified materials.

9.2.3 Assumptions

1. Hazardous materials survey will be limited to accessible areas and areas where construction is anticipated to be performed. For example, materials which are located behind walls, cabinets, above suspended ceilings, gaskets as part of pipe joints, etc. cannot be readily accessed.
2. No intrusive investigations are included.
3. It is assumed that Polychlorinated Biphenyls (PCBs) which may have existing previously at this facility have been properly and previously removed/mitigated.
4. Buildings on properties that have recently been purchased, or are in the process of being acquired, by ALRW, for expansion of the WFP facilities beyond the existing site, will be demolished under a separate project. HDR will coordinate with ALRW on these demolition activities, but it is assumed that they will be completely removed (basements included) and backfilled with aggregate.

9.2.3 Key Deliverables

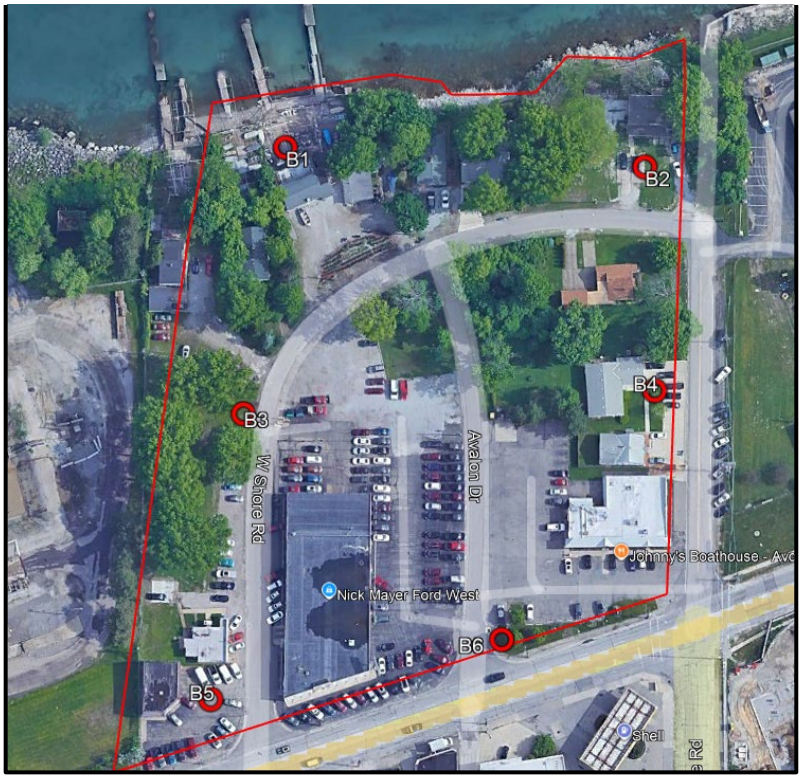
1. Draft and final Hazardous Building Material Survey Report including an engineering cost estimate for abatement work
2. As part of the Detailed Design subtask 9.4, draft and final specifications for hazardous building materials abatement work and worker protection from hazardous materials for the construction work, if required

9.2.4. Geotechnical Investigation

From previous projects there exists some geotechnical information for the existing WFP and WRF sites, as well as various locations between the WFP and Miller Road Pump Station. An initial, preliminary phase of geotechnical investigation is therefore proposed to determine the geotechnical feasibility of development on the properties that have recently been purchased, or are in the process of being acquired, by ALRW, for expansion of the WFP facilities beyond the existing site. This preliminary geotechnical investigation will be carried out by a geotechnical subconsultant, and will consist of the following:

- Perform a desktop study to review historical boring information and geological references from the area in/around the properties.
- Prepare a site-specific safety plan for the field work.
- Coordinate with ALRW to obtain permission to access the site(s).
- Stake/mark the boring locations and determine their surface elevations.
- Contact OUPS to locate and mark public utilities.
- Retain a private utility locator to mark private utilities near our boring locations.

- Mobilize a drill rig to drill six Standard Penetration Test (SPT) borings, as shown on the below figure, extending to depths of 15 feet or refusal. Record groundwater levels in the boring during and immediately after drilling. At completion, the boreholes will be backfilled with auger cuttings.
    - Perform laboratory tests including visual soil classification, moisture content tests, hand penetrometer tests, and up to three soil index tests.
- Analyze the soil and groundwater conditions from the desktop study and the field and laboratory testing, perform engineering calculations, and develop initial recommendations.
- Summarize the findings in a Preliminary Report that will include:
    - Descriptions of the site conditions and task information.
    - Descriptions of the field and laboratory testing programs.
    - Descriptions of the soil and groundwater conditions encountered in the borings.
    - Feasible foundation alternatives for development of the site based on the information obtained from the borings, including a range of allowable soil bearing pressures and depth to suitable bearing soils for shallow foundations, or feasible alternatives for deep foundations and/or ground improvement, if necessary.
    - Discussion about utility installation considerations, including impact of estimated soil and rock profile on utility excavations.
    - Discussion about tunnelling and foundation support for the planned intake structure.
    - Preliminary comments about potential construction considerations related to the geotechnical conditions disclosed by the borings, including potential issues that could impact development of the site.
    - Boring logs and a boring location diagram.



The second phase of geotechnical investigation will consist of a design level evaluation. Once information regarding the location and depth of proposed structures (including the transmission main) is available, the subconsultant will prepare a Phase 2 exploration plan, with borings located at planned structure locations. It is anticipated that the Phase 2 exploration will include offshore borings for the intake structure. The information from these borings will be used to develop a final geotechnical report.

9.2.4 Assumptions

1. Drilling is not permitted at the existing WFP and WRF sites.
2. Based on the subconsultant's current drilling schedule, it is anticipated that field drilling services for the preliminary geotechnical investigation can be performed within four weeks after receiving authorization to proceed. The field exploration should take approximately one day to complete. Once the field exploration is complete, laboratory testing and geotechnical report preparation can normally be completed within about 15 business days.
3. ALRW will coordinate access to properties it does not currently own.
4. Preliminarily, it is assumed that the Phase 2 exploration will consist of:
    - 10 additional borings in the WFP facilities footprint, drilled to 20 feet of refusal.
        - 20 feet of rock coring in at least five borings (40-foot total depth), assuming structures as deep as 30 feet below grade.
    - 14 borings along the proposed pipeline alignment, spaced approximately 1,000 feet apart, and drilled to 15 feet or refusal.
    - Five offshore borings for the proposed intake structure, spaced approximately 1,000 feet apart, and drilled to 120 feet below the mudline including rock coring. Subconsultant will obtain all permits, and notify maritime authorities, for Lake access/work.
    - Three mobilizations to complete the above activities.

9.2.4 Key Deliverables

1. Draft and final Preliminary Report
2. Draft and final Phase 2 Geotechnical Report

9.2.5. Phase I Environmental Site Assessment

Adhering to the ASTM standard E1527-21, HDR will conduct a regulatory database review of environmental records for the properties that have recently been purchased, or are in the process of being acquired, by ALRW, for expansion of the WFP facilities beyond the existing site, to evaluate historical land-use. Upon completion of the desktop review, HDR will complete a Phase I Environmental Site Assessment (ESA) field investigation. The objective of the Phase I ESA is to identify Recognized Environmental Conditions (RECs) that either currently exist or may have existed (i.e., historic (HREC) with engineering controls (CREC) on or around the properties as defined under the ASTM Method E1527-21 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM Standard).

- HDR will utilize a research firm to provide a regulatory database search of the properties that will include ASTM-prescribed federal, state, tribal, and local databases within the ASTM-prescribed search distances. If determined to be necessary, HDR will complete file

reviews for sites listed in the database that, in the view of an HDR environmental professional, may pose an impact to the properties.

- HDR will review historical information for the properties, as applicable and available, according to the determination of the HDR environmental professional. If available, this will include publicly available environmental data from the adjacent property where the recently demolished Power Plant was located.
- HDR will perform a site reconnaissance of the properties, in accordance with the guidance provided in the ASTM standard. The site reconnaissance will be conducted in order to identify potential RECs located on the properties, or on surrounding properties with the potential to impact the properties. The site reconnaissance may also be augmented with a Site Reconnaissance Questionnaire that will document the general setting and exterior and interior observations (if applicable and available).
- HDR will conduct interviews with property owners and people with knowledge of the properties as appropriate. If conditions warrant, interviews with surrounding property owners will be conducted. A narrative will be prepared to document the past use(s) of the properties. Interviews will be conducted, as appropriate, with local government officials who may have specific information on the properties, including the local fire department, health department, planning department, and historical society/library, to determine any additional information on the historical land use of the properties and surrounding properties.
- Two conference calls will be completed with ALRW and users of the Phase I Report to review the results of the assessment.

9.2.5 Assumptions

1. ALRW will provide a site map or survey of the properties already owned by ALRW and a title abstract report, if available, identifying the parcel(s) that are the subject of this site assessment.
2. No invasive site work, quantitative chemical analysis, asbestos, lead-based paint, components of building materials, radon, wetlands, archaeological or threatened & endangered species reviews are included in the scope of this ESA.

9.2.5 Key Deliverables

1. Draft and final letter Report providing the Phase I Environmental Site Assessment

9.2.6. Phase II Environmental Site Assessment

HDR will perform a Phase II Environmental Site Assessment in general conformance with the ASTM E1903-19. The purpose of a Phase II ESA is to verify RECs identified in the Phase I ESA and to quantify the concentrations in the media that have been impacted. The objectives of the Phase II ESA are to:

- Perform Site Characterization. Phase II investigations will collect soil, water, groundwater, and/or sediment samples to identify areas of contamination and quantify the concentrations of chemicals present against regulatory standards.
- Address Data Gaps for Future Use of the Property. Sampling locations will be used to close data gaps or lack of information that will be relevant for the future use of the property

or to complete a site conceptual model that identifies sources, pathways of exposure and potential receptors if contamination exists.

- Regulatory Compliance. Information will be used to identify and meet regulatory requirements for future redevelopment, to add to construction bid specifications for the proper management and costing of impacted materials disposal, and to support permit requirements for redevelopment.

HDR is providing a Phase II scope of work for two components of the project: properties identified for purchase for expansion of the WFP facilities and for the linear portions of the project including the new intake and the inland transmission main to the Miller Road Pump Station. The focus of the Phase II ESA will be to identify areas of the site where due diligence has identified the potential for soil, groundwater, surface water or sediment impacts and obtain information to inform construction to proper management of impacted materials.

WFP Facilities Properties

HDR anticipates a three-day field effort to complete the Phase II ESA. HDR anticipates the following activities will be required:

- Develop a Health and Safety Plan (HASP) based on the conclusions and recommendations of the Phase I ESA.
- Develop a Sampling and Analysis Plan that includes the methods and procedures to collect soil, groundwater, sediment or surface water samples. Exact methods will be dependent on the conclusions of the Phase I ESA.
- Analytical Testing is anticipated to include Volatile Organic Compounds (VOCs) using United States Environmental Protection Agency (USEPA) Method 8260, semivolatile organic compounds using EPA Method 8270, and Target Analyte List (TAL) Metals using EPA Method 6000 series.
- Complete a maximum of 30 borings to groundwater using a Geoprobe or similar device. Depth of borings will be a maximum of 12 feet or groundwater whichever is encountered first. HDR assumes that in 10 boring locations a groundwater sample will be collected. No sediment or surface water sampling will be required under this task.
- Borings will be screened with a Photoionization detector and combustible gas indicator for health and safety and to identify soil horizons that may be impacted by fill material or historical releases.
- Borings will be backfilled upon completion.
- HDR will provide a report summarizing the methods and procedures used to collect the information, a summary of the analytical results compared to appropriate regulatory standards and recommendations for redevelopment or further assessment and remediation.

Linear Properties

HDR understands that between the intake and the transmission main to the Miller Road Pump Station approximately 13,000 feet of linear feature will be assessed. Assessment will be tailored to areas identified in the desktop study that may impact the corridor based on future design, but

this scope of work provides methods and procedures to develop a estimate and preliminary scope. HDR anticipates the following activities will be required:

- Develop a Health and Safety Plan (HASP) based on the conclusions and recommendations of the Desktop study.
- Develop a Sampling and Analysis Plan that includes the methods and procedures to collect soil, groundwater, sediment or surface water samples. Exact methods will be dependent on the conclusions of the Desktop study.
- Analytical Testing is anticipated to include Volatile Organic Compounds (VOCs) using United States Environmental Protection Agency (USEPA) Method 8260, semivolatile organic compounds using EPA Method 8270, and Target Analyte List (TAL) Metals using EPA Method 6000 series.
- Complete a maximum of 20 borings to groundwater using a Geoprobe or similar device. Depth of borings will be a maximum of 12 feet or groundwater whichever is encountered first. Included in this estimate are two surface water samples and two sediment samples in association with the lake pipe intake.
- Borings will be screened with a Photoionization detector and combustible gas indicator for health and safety and to identify soil horizons that may be impacted by fill material or historical releases.
- Borings will be backfilled upon completion.
- HDR will provide a report summarizing the methods and procedures used to collect the information, a summary of the analytical results compared to appropriate regulatory standards and recommendations for redevelopment or further assessment and remediation.
- HDR will subcontract the drilling for lake or inland areas and laboratory but has not budgeted for any traffic permits or controls.

9.2.6 Assumptions

1. HDR understands that the location, methodology and cost may change based on site specific conditions.
2. Weather conditions may delay or increase the level of effort.
3. A site specific scope of work an estimate will be provided following the execution of the Phase I ESA or Desktop Phase I ESA.

9.2.6 Key Deliverables

1. Draft and final Report providing the Phase II Environmental Site Assessment for the WFP facilities portion of the project
2. Draft and final Report providing the Phase II Environmental Site Assessment for the linear portion of the project

9.2.7. Desktop Environmental Study

HDR will perform a preliminary desktop review of the properties that have recently been purchased, or are in the process of being acquired, by ALRW, for expansion of the WFP facilities beyond the existing site, and along the path of the proposed transmission main from the WFP to the Miller Road Pump Station. This study is for environmental needs outside the scope of the

ASTM E1527-21 standard, but will also utilize applicable environmental data, mapping, and current regulatory guidance to produce a summary of environmental conditions and concerns. The desktop review information available in the public domain will include, but may not be limited to, the following:

- Determination of land use characteristics for the properties by reviewing recent satellite imagery (aerial photographs) and relevant U.S. Geological Survey (USGS) 7.5-minute topographic maps to determine the presence or absence of identified land use constraints. Review of current/recent satellite imagery or publicly available identified aerial photographs, the National Hydrography Dataset (NHD), and U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps to determine the potential presence of waters of the United States on or adjoining the properties. In addition to wetlands, any drainage areas mapped on the USGS topographic maps, or any natural or man-made reservoirs and ponds will be included in the review.
- Review of United States Department of Agriculture (USDA) National Resources Conservation Service (NRCS) Soil Survey Maps for the area of the properties to determine the potential for the presence of hydric soils.
- Review of Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) to determine the presence of floodplains or other similar constraints that may impact the work.
- Review the Ohio Department of Natural Resources (ODNR) – Division of Wildlife Threatened and Endangered County Species list.
- USFWS – IPaC review for federal threatened and endangered species, special concern species, and significant ecological features in the vicinity of a properties to determine the potential presence of federally-protected species.

9.2.8. Aquatic Resource Study

HDR will conduct a field visit to document United States Army Corps of Engineers (USACE)-regulated jurisdictional Waters of the U.S. (WOTUS) and OH Environmental Protection Agency (OEPA) regulated waters of the state within the area of the planned work. A delineation of wetland boundaries will be conducted using the existing soils, vegetation, and hydrology in association with the current 1987 USACE delineation method and the appropriate USACE (2010) Regional Supplement to the Corps of Engineers Wetland Delineation Manual. and the Ohio Rapid Assessment Method (ORAM). Jurisdictional waters (i.e., streams, lakes, ponds) will be identified based on Ohio's Primary Headwater/Qualitative Habitat Evaluation Index and ordinary high-water mark (OHWM), defined bed and bank features, and flow regime. USACE-regulated and OEPA-regulated waters boundaries (i.e., streams and wetlands) will be mapped using a GPS device capable of sub-meter accuracy. HDR will also fill in the USACE Wetland Determination Data Forms and ORAM data forms for wetlands or uplands, and QHEI/HHEI dataforms for streams found within the area of the planned work. A summary technical memo detailing all wetlands and streams located at the area of the planned work will be provided, along with photos, maps, and field data sheets. GIS delineation and location data collected in the field will also be provided.

9.2.8 Key Deliverables

1. Draft and final Technical Memorandum detailing all wetlands and streams

2. Spatial files of the wetlands and waterbodies delineated during the survey (KMZ and/or SHPs)

9.2.9. Threatened and Endangered Species and Wildlife Coordination

HDR will consult digital mapping and data inventory from the Ohio Department of Natural Resources (ODNR) – Division of Wildlife Threatened and Endangered County Species list and the USFWS – IPaC review for federal threatened and endangered species, special concern species, and significant ecological features in the vicinity of planned work area to determine the potential presence of state and federally-protected species.

9.2.9 Assumptions

1. No threatened and endangered species surveys are included in this scope of work.

9.2.9 Key Deliverables

1. Draft and final Technical Memorandum summarizing the results of Habitat Assessment findings
2. Shapefiles and KMZ files compatible with Google Earth and the other with GIS software, for the ecological features on site, if applicable

9.2.10. Cultural Resource Desktop Review

HDR will conduct a desktop review of cultural resources to identify previous surveys that have been conducted and available, previously recorded cultural resources, including archaeological sites and aboveground resources, or National Register of Historic Places (NRHP)-eligible/listed cultural resources within or within one mile of the area of the planned work. HDR will review data maintained by the Ohio History Connection. In addition to the Ohio History Connection, HDR will also consult the National Park Service's (NPS) National Register of Historic Places (NRHP), the U.S. Geological Survey's TopoView for current and historical topographic maps, the U.S. Department of Agriculture's Web Soils survey, Ohio's Department of Transportation Aerial Imagery Archive, and the Library of Congress for resources located within the archaeological footprint and area of the planned work relative to the history/architecture needs. HDR will also assemble relevant information on the following aspects of the area of the planned work: soils; hydrology; geology; and general flora. The results of the desktop review will be used to inform the level of effort for the cultural resources survey.

9.2.11. Cultural Resources Survey

Under Section 149.53 of the Ohio Revised Code (ORC), all departments, agencies, units, instrumentalities, and political subdivisions of the State of Ohio shall cooperate with the Ohio History Connection (OHC) and the Ohio Historic Site Preservation Advisory Board in the preservation of archaeological and historic sites and in recovery of scientific information from such sites; and, whenever practical, by contract or otherwise provide for archaeological and historic survey and salvage work during the planning phase before work on a public improvement begins or at other appropriate times. This requires contractors performing work on public improvements to cooperate with archaeological and historic survey and salvage efforts and to notify the OHC about discoveries of archaeological resources.

Prior to fieldwork, HDR will determine if any proposed methods may differ than those presented in the OHC Archaeology Guidelines, and if so, will consult with the State Historic Preservation Office at the OHC. The cultural resources investigations will be conducted in two parts. Due to potential impacts within Lake Erie, a marine archaeological assessment will be required. In addition, the proposed improvements on land will be investigated via a terrestrial archaeological resources survey.

Terrestrial Survey

The intensive terrestrial archaeological investigation will be carried out for the new WFP properties and along the new transmission main route to determine the presence/absence of archaeological resources within the project area and to evaluate identified resources for their eligibility for inclusion in the National Register of Historic Places (NRHP). The intensive survey will include the visual inspection of the ground surface at 10-meter intervals should visibility be greater than 50-percent. In cases where plant materials impede the surface visibility, shovel testing will occur at 15-meter intervals. Each shovel test will be 0.5-m x 0.5-m (square) in dimension and excavated in natural stratigraphic levels or 10 cm levels within natural levels to depths reaching bedrock or parent glacial material, or in which no archaeological materials are discovered. shovel test units will be excavated to at least 50 cm depth below ground surface, unless subsoil, bedrock, or the water-table is encountered. Excavated soil will be screened through 0.25-inch mesh, and artifacts will be collected. Shovel tests will be immediately backfilled upon completion. Attributes of each shovel test will be recorded, specifically a unique number, location, depth, soil profile, contents, and other pertinent information. All shovel test locations will be recorded using a GPS unit with sub-meter precision.

Sites discovered during pedestrian survey will be delineated based on the extent of the surface artifact scatter and supplemented with judgmental shovel testing in order to establish the vertical limits of the site. Sites discovered during shovel testing will be delineated through close-interval (10-meter) shovel testing until two sequential negative shovel tests are encountered in each cardinal direction. Site boundaries will not be delineated outside the APE. Artifacts recovered during the survey will be recorded and photographed. Diagnostic artifacts will be collected for further analysis, and a sample of all other artifacts will be collected. Collected artifacts will be placed in plastic bags labelled in permanent ink with the shovel test identification number, date, and depth below surface.

Submerged Survey

Due to the proposed work including the potential for submerged archaeological resources, a marine archaeology remote-sensing survey may be necessary. If archaeological resources are identified and occur within Lake Erie, consultation with ODNR and SHPO is required to determine the most appropriate course of action.

Typically, requirements for all submerged resource surveys, include:

- A differentially-corrected global positioning system receiver or system of equal or greater accuracy to continuously log the surface position of the vessel.
- Surveys for linear undertakings, such as submerged transmission cables or pipelines, should include a centerline based on the projected path of the infrastructure to be installed,

and offsets to either side. The use of a centerline is intended to allow for collection of data directly along the area to be impacted by operations.

- The report must identify all project personnel and their role(s), equipment specifications and settings used in the survey, field and operating conditions, survey procedures, data quality, discussion of any data acquisition issues/problems that impact quality or interpretation, and post-processing procedures (including software used and workflows followed).
- Operation of equipment and data interpretation must be done by or under the direct supervision of a qualified maritime archaeologists.

Reporting

HDR will prepare an investigation report detailing the findings of the archaeological assessment. The report will follow the guidelines set forth in OHC's Archaeology Guidelines. The report will include environmental, archaeological, and historical background of the area; the results of the literature search; and a description of the methods of survey and analysis. The reports will state HDR's recommendation of NRHP eligibility of each archaeological site identified. At the requested level of investigation, the eligibility of many archaeological sites may not be determinable. The report will meet accepted professional standards and state guidelines for survey reports and be of publishable quality.

After receipt of review comments, HDR will prepare the final reports incorporating changes requested by ALRW and SHPO. HDR will submit electronic copies in PDF format of the final report.

9.2.11 Assumptions

Terrestrial Survey Assumptions

1. HDR will perform terrestrial field survey within three weeks of completing the desktop review and determining if additional consultation with the SHPO is required.
2. HDR assumes one mobilization for the terrestrial survey and that right of entry will be granted to all parcels at the time of survey.
3. A maximum of two archaeological sites no larger than 0.5 acres will be recorded. When archaeological sites are identified, their delineation will not extend beyond the project area boundaries. If additional sites are located, their recordation would be an additional service.
4. Costs for the analysis of up to 50 artifacts have been included in the current proposal. Should analysis of additional artifacts be necessary, additional funding will be required.
5. The current cost estimate does not include NRHP/SAL testing or mitigation.
6. HDR assumes no historic resources will be recorded as part of the survey, although a review of previously recorded historic resources will be included in the survey report.
7. HDR assumes no human burials will be encountered. If human burials are encountered, burial exhumation, osteological analysis, and reporting would be an additional service.
8. No archival research is included in this cost estimate.
9. No specialized collections, such as flotation or radiocarbon samples, will be undertaken as part of this work.
10. Any delays due to changes in the alignment, inclement weather, or parcel access issues may increase field costs and result in supplemental fee requests.

11. HDR assumes one round of comments on the draft terrestrial survey report from ALRW and one round of comments from SHPO.

Submerged Survey Assumptions

1. HDR assumes that a submerged resources survey will be necessary, although it may not occur on the same schedule as the terrestrial survey
2. A survey research design will be submitted to SHPO and ODNR, prior to the start of fieldwork, if submerged archaeological resources are identified to be potentially affected by the proposed undertaking. The research design must be developed by an experienced maritime archaeologist and in consultation with SHPO, ODNR, and the USACE.
3. HDR will hold a $35,000 reserve for the submerged resources survey. Once the design for the intake reaches 80%, HDR will either subcontract a consultant with a qualified marine archaeologist that has experience conducting investigations in Lake Erie or perform the tasks in-house. The decision will be dependent on schedule.
4. HDR assumes one previously recorded archaeological site is present within the vicinity of the intake structure and boring.

9.2.11 Key Deliverables

1. Draft and final terrestrial survey Technical Report prepared in compliance with the guidelines published by the Ohio History Connection
2. Draft and final submerged resource survey Technical Report prepared in compliance with the guidelines published by the Ohio History Connection

9.3. Preliminary Design

9.3.1. Army Corps of Engineers Pre-Application Meeting

HDR will schedule a Pre-Application Meeting with the U.S. Army Corps of Engineers (USACE) to provide an overview of the intake design. The Meeting agenda will include a review of the relevant environmental investigations, as well as a general discussion of the conceptual design, to solicit their input on the approach for incorporation into the Basis of Design. It is assumed that the workshop will be held in person, in Buffalo, NY, and is estimated to be up to two hours in length.

9.3.2. Ohio EPA Pre-Design Meeting

HDR will schedule a Pre-Design Meeting with Ohio EPA to provide an overview of the proposed work. The Meeting agenda will include a review of the current facilities and approved capacity, as well as a general discussion of the proposed expansion, to solicit the Agency's input on the approach for incorporation into the Basis of Design. It is assumed that the workshop will be held in person, in Twinsburg, OH, and is estimated to be up to two hours in length.

9.3.3. SCADA/Controls Needs Assessment

HDR will collect and review existing control systems documentation followed by conducting a field investigation of the existing SCADA system to assess current state of the system including field instruments, system hardware, software, networking components and preliminary review of the existing programs and screens. The focus of this investigation will be primarily on WFP processes that were not included in the ongoing Improvements project – raw water pumping, high service pumping, and pre-treatment (rapid mix, flocculation, sedimentation).

An in-person, two-hour SCADA/Controls Workshop will be held with ALRW and ALRW's integrator – SOS Integration – to discuss the findings during the current state assessment and range of potential instrumentation/controls options which can be considered for the expansion, including reliability and redundancy considerations, and semi-automatic/ automatic control. Options for hardware, software and Human Machine Interface configurations will also be discussed.

HDR recognizes cybersecurity as a risk inherent to Operational Technology (OT) systems and therefore has developed a dedicated operational technologies cybersecurity team. HDR's team is integrated into standard workflow for design of OT systems through application of the NIST risk management framework to evaluate and incorporate appropriate security controls commensurate with the owner's risk tolerance. HDR will develop a (confidential) Report outlining the design basis for applying cybersecurity, a recommended security controls list based on NIST 800-82 for each system to be incorporated into ALRW selected controls within the control system design. The cybersecurity assessment will include two workshops – one upon submittal of the Report to present to ALRW the findings, and a second to discuss ALRW's feedback.

9.3.4. Basis of Design Report Development

Under this Task the HDR Team will prepare a Basis of Design (BODR), which will build upon the work summarized in the Master Plan report and refined through the activities completed as part of subtasks 9.1 and 9.2, defined above. The BODR will contain the following:

1. Summary of the Master Plan and work that was completed in planning subtask 9.1 (through incorporation of the Technical Memoranda).
2. Summary of existing conditions and code compliance reviews.
3. Utility coordination summary, including power, wastewater, gas, telephone, and internet/SCADA.
4. Findings from the field investigations in subtask 9.2 – topographic survey, hazardous materials survey, preliminary geotechnical investigation, and environmental permitting related activities.
5. Control systems investigations and Workshop summary, identifying recommendations for: field instruments, system hardware, software, networking components, final cybersecurity report (if applicable).
6. WFP and utility power considerations, as well as standby power requirements.
7. Regulatory considerations.
8. List of required permits.
9. Updated Ohio EPA Approved Capacity Basis of Design Table.
10. Design criteria, by discipline (Civil, Structural, Architectural, Mechanical Process, HVAC/Plumbing/Fire Protection (HVAC/P/FP), Instrumentation and Controls, and Electrical).
11. WFP site plan showing existing facilities to be retained/retrofitted, new facilities, the corridor between the two sites.
12. Future expansion space allocation and other accommodations.
13. Proposed hydraulic profile illustrating conditions at minimum, average and peak flows.
14. MOPO Plan.

15. For the transmission main, preliminary design calculations, alignment (GIS only), profile, typical sections and major dimensions, quantity list, preliminary land and easement acquisition needs, and major utility relocations required.
16. Summary of impacts to the WRF based on additional solids production from the WFP, including:
    a. existing WRF thickening and dewatering equipment capacities, including hours of operation and identification of operational limitations/concerns from plant staff,
    b. projected increased liquid and solids loads based on incremental capacity increases at the WFP, and
    c. additional facility/equipment needs to handle those increased flows and loads.
17. Proposed project and construction packaging.
18. Preliminary schedule for final design, permitting, and construction.
19. Preliminary construction schedule showing sequencing, planned tie-ins/cutovers, and constraints.
20. Initial EOPCC [Association for the Advancement of Cost Engineers (AACE) Class 4].

9.3.4 Key Deliverables

1. Draft and final BODR

9.3.5. 30% Design

For the intake, raw water pump station, and other WFP and WRF facilities, 30% design documents will consist of:

1. Major equipment list
2. Process flow diagram
3. Design criteria table
4. Updated hydraulic profile
5. Site layouts and grading, building layouts including any new administrative and/or maintenance facilities
6. Civil, Structural and Architectural Drawings – approximately 30% complete
7. Mechanical Process Drawings – approximately 50% complete
8. Process and Instrumentation Diagrams – approximately 75% complete
9. Electrical and HVAC/FP/P Drawings – approximately 10% complete
10. Specifications Table of Contents and outline specifications

For the transmission main, 30% design will include:

1. Base Files – HDR will prepare base drawing files from existing record information and surveyed locations of existing utilities, infrastructure, buildings, property lines, easements, trees/landscaping, and other pertinent information.
2. General Plans – HDR will prepare general plan sheets necessary including cover, general notes, sheet index, control sheet, and typical sections.
3. Plan & Profile Drawings – HDR will:
    - Establish preliminary horizontal and vertical pipeline alignment along proposed easement and route.

- Establish preliminary horizontal alignment and vertical profile for proposed pipeline.
- Determine conflicts with private property including fences, mailboxes, driveways, sidewalks, landscaping, etc., and provide preliminary replacement or alternate design options if required.
- Present any potential alternatives which may provide cost savings to ALRW.

4. Tunnel Drawings – HDR will provide design sheets for each trenchless location to show depth of trenchless crossing and proposed easements.
5. Land Acquisition – HDR will establish and depict preliminary ROW and easement needs.

The 30% design documents will also include an updated BODR including an updated EOPCC.

A Design Review Workshop will be held with ALRW concurrent with the 30% design submittal to present the design to ALRW staff and to facilitate their review using the 3D BIM model. A second workshop will be held after receiving ALRW's comments, to discuss. Each workshop is assumed to be in-person, up to three hours in length.

A second in-person, two-hour SCADA/Controls Workshop will also be at the end of the 30% design development, to build upon the findings of previous workshop, as described in subtask 9.3.3. Topics for this Workshop will include the following: general WFP control philosophy, onsite and offsite control, monitoring, reporting, integration of existing sites' controls with the new facilities controls system, and new facilities site security features including access control and video surveillance. HDR will coordinate with ALRW's IT Department regarding routing data networking infrastructure to the new facilities.

- SCADA integration including development of process control narratives is not included in the base scope of work but could be added as a supplemental service. It is assumed that ALRW's integrator SOS Integration will perform the programming.

Relating to the large diameter transmission main, upon approval of the 30% design plans, the HDR Team will survey, render field notes, and prepare ROW and easement maps and individual parcel attachments for any additional ROW and/or easements, including temporary construction easements and/or easement abandonments needed. This includes performing necessary surveying operations for the identification and delineation of right- of-way and easement parcels. The scope includes preparing ROW & easement documents for up to 60 parcels (temporary and permanent easement for each), and will include the following:

1. ROW Maps – the HDR Team will provide ROW Map showing properties with ownership and include existing and proposed ROW and easements.
2. Parcel Attachments – individual parcel attachments will be in both hard copy (8 ½" x 11") and PDF format, will be sealed, signed and dated by a Registered Professional Land Surveyor and will contain the following:
   - Parcel Identification Number
   - Area Required
   - Area Remaining
   - Legal Description
   - Current Ownership

- Any existing platted easement or easements filed by separate instrument including easements provided by utility companies
- All physical features
- Metes and bounds description of parcel to be acquired. The description will be provided on a separate sheet from the attachment. Each type of easement will be described separately. Three copies of ROW documents will be provided to ALRW.

3. ROW Corners – the HDR Team will establish proposed easement and ROW corners on the ground (one-time).
4. ROW Staking – the HDR Team will provide ROW staking at 100 ft stations and property corners for franchise utility relocation purposes (one time per location as needed).

Also following approval of the 30% large diameter transmission main design plans, HDR will coordinate with ALRW to review potential environmental site constraints, permitting requirements, and provide recommendations for the avoidance and minimization of federal and state waters. HDR will incorporate delineated wetland and stream boundaries onto the site layout drawings to establish the proposed jurisdictional impacts to the project. HDR will prepare the appropriate documentation to be used in submittal of a Nationwide Permit 58 – Utility Line Activities for Water and Othe Substances Application to the USACE Buffalo District. The drawings will include plan view, section view, elevation view, and profile and grade drawings of proposed impacts utilizing delineated wetland and stream boundaries.

The following permits/approvals are also assumed to be needed, and will be coordinated by the HDR Team:

- CWA 401 Water Quality Certification
- Ohio SHPO for NWP 58 approval
- Stormwater Pollution Prevention Plan based on aquatic resource requirements
- Local floodplain permit
- ODNR In-Water Work Waiver Request

9.3.5 Assumptions

1. Five construction packages will be developed – one for the new intake, one for the transmission main, and three relating to the WFP and WRF facilities including the raw water pump station: (1) Phase 1, (2) Phase 2, and (3) phases 1 and 2 combined.
2. For the large diameter transmission main, the planned work will meet the requirements of a permit outlined in the Nationwide Permit program. If the project does not meet these requirements, appropriate coordination and submittal of an Individual Permit (IP) application can be provided with additional scope.

9.3.5 Key Deliverables

1. Design documents as described above
2. Completed Nationwide Permit Pre-Construction Notification package

9.4. Detailed Design

For the intake, raw water pump station, and other WFP and WRF facilities, the 60%, 90% and 100% documents will include demolition drawings of any existing WFP facilities, if needed. Additionally, specifications will be included for hazardous materials abatement work and worker protection from hazardous materials in construction specification for the demolition work, if required. Abatement drawing plans will be included with abatement work specifications.

At 60%, the site, mechanical process, flow diagrams, and process instrumentation and control drawings, drawing views and sections will be in advanced stages of completion. Specifications will also be progressed accordingly. The 60% submittal will include:

1. Civil, Structural and Architectural Drawings – approximately 70% complete
2. Mechanical Process Drawings – approximately 75% complete
3. Process and Instrumentation Diagrams – approximately 90% complete
4. Electrical and HVAC/FP/P Drawings – approximately 40% complete
5. Specifications will consist of a combination of base (unedited) and outline specifications
6. Instrumentation list and details
7. Construction sequencing and duration updates, including updating the MOPO plan, and initial preparation of a start-up and commissioning plan

The 90% and 100% final design will include completion of required drawings, specifications, and other documents (e.g., MOPO Plan). The 90% submittal will be considered essentially complete, pending final ALRW comments. The drawings will be sealed after final review with ALRW for the 100% issue. Additional activities which will be performed between the 60% and 90% design submittals are:

1. Hold a second, but virtual, meeting with Ohio EPA, to solicit their input on the design.
2. Meet with the Fire Marshal, in-person, to present 60% and 90% design and receive comments (total two hours).
3. Landscaping design will be initiated after ALRW approval of the 60% submittal.
4. MOPO and Safety-In-Design will be discussed in conjunction with the 60% and 90% submittals.
5. Updated schedule for final design, permitting, and construction.
6. Prepare the Ohio EPA Plan Review application, and applications for any other Ohio EPA permits (e.g., PTI for any WRF improvements) at the time of 90% design submittal.

For the transmission main, the 60% submittal will include the following:

1. All drawing views and sections and specifications are commenced.
2. Pipeline mainline plan and profile completed, with easements indicated.
3. Drawings are refined, although some custom details may be incomplete.
4. Refinements to alignment and layout are complete.
5. Initial plans for utility relocations, traffic maintenance, sediment and erosion control and permanent stormwater management are developed.
6. Preliminary construction details are shown.
7. Draft technical specifications.
8. Construction duration schedule, updated.

The 90% and 100% final design will include completion of required drawings, with easements indicated, specifications, and other documents (e.g., quantity list). The 90% submittal will be considered essentially complete, pending final ALRW comments. The drawings will be sealed after final review with ALRW for the 100% issue. HDR will prepare the Water Supply Data Sheet for submittal to the Ohio EPA, in support of ALRW's self-certification.

As the design progresses, potential changes to the BODR will be memorialized in addendum format, until the 90% submittal, at which time the BODR will be updated accordingly. Additionally, with each submittal an updated EOPCC will be provided. At a 60% level of completion the EOPCC will be AACE Class 3, and at a 90%/100% level of completion it will be AACE Class 2.

For each submittal, a Design Review Workshop will be held with ALRW concurrent with the submittal to present the design to ALRW staff and to facilitate their review using the 3D BIM model. A second workshop will be held after receiving ALRW's comments, to discuss. Each workshop is assumed to be in-person, up to three hours in length.

9.4 Assumptions

1. Instrumentation loop drawings will not be provided.
2. Cybersecurity mitigations accepted in the BODR will be incorporated in the design documents.

9.4 Key Deliverables

1. Design documents as described above
2. Draft and final permit applications
3. Final GIS alignment for the new transmission main
4. Updated WaterGEMS model

General Assumptions

The following general assumptions apply to the sub-tasks and activities included in this scope of work, defined above:

- HDR will prepare meeting agenda, handouts, and presentation materials for meetings and workshops.
- Deliverables will be submitted as Adobe PDF files. Native files (MS Office, Project, AutoCAD Civil 3D 2020, AutoCAD Revit) can be provided upon request.
- The task schedule will assume a two-week period for ALRW reviews of design deliverables.
- ALRW review comments on all draft deliverables will be provided to HDR in one collated file that resolves conflicting comments.
- ALRW will provide access to ALRW-owned properties that need to be available over the task duration.
- Bench testing and/or pilot testing are not included in the scope of work but could be added as a supplemental service, if needed/desired.
- Design will follow Ohio Building and Construction Codes (i.e., Building, Electrical, Fire, Mechanical, Plumbing, etc.) in effect at the time preliminary design is started; assumed to

be the 2024 Ohio Building Code (based on the 2021 International Building Code) and 2020 Electrical Code.

- Envision or LEED compliance requirements will be considered during the design. If formal verification/certification is desired by ALRW, this can be provided as a supplemental service.
- A decision log will be developed to track decisions made at each design milestone.
- The Construction Standards Institute (CSI) Master Format standard will be used. Contract specifications (i.e., front-end Division 00 and 01 documents) will be provided by ALRW prior to the 90% design submittal.
- ALRW will be responsible for paying for permitting and agency review fees.
- Public outreach will be provided by ALRW staff, as needed. HDR can attend public meetings and/or provide strategic communications support as a supplemental service.
- Bidding, Construction Administration, and Inspection services are excluded herein, but could be provided as a future task.