



**CITY OF GLOBE
PROFESSIONAL SERVICES CONTRACT
With
EUSI, LLC**

**Final Draft Report
4-24-13
For
Task Order #1**

Initial Site Visit and Observations of the Water and Wastewater Facilities

Based upon the approval of the City, EUSI conducted activities associated with Task Order #1 and offer the following report, which presents Water System **Recommendations, General Observations**, followed by **Specific Observations** noted during the site visits to specific water system facilities. The report will then present Wastewater Treatment Plant **Recommendations, General Observations**, followed by **Specific Observations** noted during the site visit for specific wastewater plant facilities. This report will provide an approach for the City of Globe to follow at their water and wastewater facilities.

On April 8, 2013 the City and EUSI conducted an initial project meeting to clarify priorities of the City and identify initial priority activities.

The City advised that there were two priority items to focus on in Task Order #1:

1. Water System Microbiological and Reporting Compliance

- Arizona Department of Environmental Quality (ADEQ) issued a Notice of Violation (NOV) 1-2-13 which has since been closed by ADEQ on 1-28-13.
- This NOV was a result of a September 5, 2012 one (1) exceedance of the Maximum Contaminant Level (MCL) for total coliform organisms. Follow-up sampling conducted on September 11, 2012 resulted in, two (2) positive samples for the presence of total Coliform bacteria. One (1) of eight (8) repeat samples collected on September 20, 2012 was positive for the presence of E.coli bacteria. In addition, ADEQ did not receive properly reported analytical results for residual chlorine sampling. ADEQ had also not received information indicating the name of the designated operator.
- This NOV focused on two items of concern:
 - Microbiological Compliance
 - Reporting Compliance

- Other Issues
 - There have been customer complaints of chlorine odors at certain residence with reportedly high residual chlorine levels measured by the customer at their kitchen sink.
- 2. Wastewater Treatment Plant Reporting and Permit Compliance
 - ADEQ issued a Consent Order December 2012 with emphasis on the following:
 - The City was not using approved Arizona Department of Health Services (ADHS) laboratory methods for pH, dissolved oxygen, temperature, and total residual chlorine compliance testing. These same issues were referenced in an ADHS inspection report of 3-3-11.
 - Discharge Monitoring Reporting (DMR) Compliance
 - Exceedence of Total Residual Chlorine (TRC) Permit Limits
 - Other Issues
 - Problems with the Disinfection and De-Chlorination Systems
 - Equipment Deficiencies
 - Official Discharge Permit Compliance Point Obstruction

EUSI conducted initial site visits and observations of Water and Wastewater Facilities on April 8th & 9th, 2013. During this initial site visit, EUSI conducted interviews and site observations during the facility and system tours with selected City staff.

- City Manager- Brent Billingsley
- Teresa Williams-Finance Director
- Matthew Rencher- City Engineer/Director of Public Works
- Ken Sellick-Water/Wastewater Maintenance Supervisor
- Jerry Phillips-Water/Wastewater Facilities Supervisor
- Paul Hendricks Conducted Water System Observation
 - Accompanied by Frank Renteria- Water System Operator
- Kris Hendricks Conducted the Primary Wastewater Treatment Plant (WWTP) Observation
 - Accompanied by Jerry Phillips- Water/Wastewater Facilities Supervisor
- Paul Hendricks also made a site visit and observations at the WWTP

At the conclusion of the initial site visits and observations of Water and Wastewater Facilities EUSI met with the City Manager to share initial observations.

Water System

Recommendations:

Immediate Actions

- The output of the liquid chlorine feed pump should be automatically paced with the output of the booster pumps that deliver water to the distribution system. The liquid

chlorine feed pump is equipped with 4-20mA controller, which could control the chlorine feed rate, based upon the output of the booster pumps.

- The liquid chlorine feed pump should be securely mounted with permanent electrical and control wiring. It is recommended that a backup liquid chlorine feed pump and chemical drum be properly installed to avoid running out of chemical during unattended operations.
- The City Engineer should prepare an engineering memo defining the new liquid chlorine feed pump system that has been installed by City staff. This information should be provided to ADEQ, to determine if further permitting is required by the agency.
- A Standard Operating Procedure (SOP) should be developed to ensure that the water system operating staff can deliver an effective chlorine dose to achieve and maintain full microbiological compliance and proper chemical application protocols in all areas of the water system.
- A Standard Operating Procedure (SOP) should be developed to ensure that the liquid chlorine now used has the published concentration of 12.5% active sodium hypochlorite, it is recommended that a Quality Control/Quality Assurance (QA/QC) protocol be established to verify the active sodium hypochlorite concentration when feed into the system. Sodium hypochlorite concentration can vary due to age and temperature, which will affect the disinfection capacity of the solution and can result in lower disinfection effectiveness in the distribution system. A high range Hypochlorite test kit could be purchased from Hach to test the concentration of the sodium hypochlorite solution. There are some options like the Hach CN-HRDT #2687100 or CN-HR #2687200, which could be utilized for testing the concentration of the hypochlorite that is utilized.
- Consideration should be made regarding an in-line chlorine residual analyzer which could be utilized to control chlorine feed rates throughout the day based upon the system demands. There are a number of manufacturers that have in-line residual analyzers that could interface with current City infrastructure.
- The City Engineer should use the Domestic Water Distribution System Hydraulic Modeling Report dated September 2011 to determine the most representative sample locations for regulatory compliance and system operation.
- The City should install an appropriate sample valve on the exterior water line, located at the booster station booster station at Crestline. Until this can be done, the screen vacuum breaker fixture should be removed from the sample valve, as the screen can be a source of contamination.
- The City Engineer should oversee the installation of at least twenty (20) dedicated sampling locations to be used for regulatory compliance for the ten (10) regulatory compliance samples per month.
- Once all locations are identified, the microbiological site sampling plan will need to be updated and submitted by the City Engineer to ADEQ for their records and approval.
- It is recommended that the City assign no more than two (2) key water system operational staff that will perform **all** water system compliance samples and prepare the official compliance reports. These key staff will need to have validated training which can be received from ADEQ or Rural Water to ensure that they follow precise compliance sampling and reporting Quality Assurance and Quality Control (QA/QC) protocols that will result in representative water samples and accurate and complete compliance reporting. The compliance sampling protocols should be documented in an

official QA/QC standard procedures manual. These compliance sampling protocols should be audited four (4) times per year for the first year and semiannually thereafter.

- The City Engineer should establish additional dedicated sampling locations at the extremities of the water system using the Domestic Water Distribution System Hydraulic Modeling Report dated September 2011 to determine the most representative sample locations to be used as operational controls. These dedicated sampling locations can assist in monitoring the free residual chlorine and combined residual chlorine in the extremities of the water system, to ensure a proper level of disinfectant throughout the water system. These dedicated sampling locations can also be used to assess the effectiveness of the water system flushing program and to monitor other water quality issues and esthetics.
- The City Engineer should assess bank erosion at Water Storage Tank sites to ensure stability of the water storage tank sites and foundations.
- The City Engineer should oversee an internal inspection of all water storage tanks. Inspections should be scheduled on a regular basis, not to exceed a three (3) year interval. During these inspections, the tanks can be cleaned and the corrosion protection systems verified for proper operation.
- The City should establish proper safety protocols associated with the handling and proper disposal of asbestos cement (AC) water pipe. The City's safety officer should audit practices and protocols to ensure compliance with applicable regulations.
- The City should establish proper safety protocols associated with Personal Protective Equipment (PPE) usage.
- Open flanges and piping which are potential sources of contamination should be closed, screened, or sealed as soon as possible.
- The City Engineer should meet with the Arizona Water Company regarding the Arlington water storage tank interconnect to ensure that there is proper back flow protection and metering between the systems. The City Engineer should check city records to determine if the Director of the Arizona Department of Water Resources has approved the interconnect between the two public water systems, as required under State of Arizona regulations.
- Proper fire extinguishers should be used in all areas of the facility. It is recommended that the fire department conduct a fire safety inspection at the facility as soon as possible.

Mid Term Actions

- There is an informal water system flushing program that is used to primarily respond to customer water quality complaints.
 - It is recommended that the City Engineer use the Domestic Water Distribution System Hydraulic Modeling Report dated September 2011, in conjunction with senior water department personnel to develop a formal water system flushing program.
- In a public water system, the general public bases their opinion of the safety and reliability of the public water system, upon the things that they can see. It is critical that general housekeeping practices, maintenance of protective coating, as well as maintenance of grounds and buildings reflect the highest standard of care.

There were a number of areas observed during these site visits that do not reflect the appropriate standard of care, and should be addressed within the next few months.

- Many of the facilities used for storage are not well organized and may not have an accurate inventory.
 - The City should schedule personnel to organize and inventory all supplies and equipment.
- Well sites and booster stations were observed to have incomplete protective coating.
 - The City should schedule personnel to apply protective coating, using the protective coating specification from the well #5 project.
- Well sites in addition to booster and water storage sites, were observed to have excessive weed growth within the sites.
 - The City should schedule personnel to remove and perhaps apply approved chemical weed retardant to the sites.
- The City Engineer should verify the elevation of the new Hagen bolted steel water tanks to determine if their elevation limits the ability to fill the tanks. The Domestic Water Distribution System Hydraulic Modeling Report dated September 2011 should be a helpful resource in making this determination.
- The City should meet with the Middle School to develop an agreement for joint use of the tanks at the Middle School which could eliminate the need for the booster station serving the Crestline area. This will improve the water circulation at the Middle School storage tank and potentially reduce power costs associated with re-boosting water to serve the Crestline area. In addition, the cost for the operation and maintenance on the booster station that would be replaced could be avoided. This project will require detailed engineering review and design services, as well as permits for right of way and system improvements.
- Due to the extreme high pressures, it is recommended that proper back flow prevention equipment be tested and certified to avoid potential contamination from the Ice House Canyon Water System.

General Observations:

- City staff changed the disinfection methods from a tablet chlorination system to a liquid feed chlorination system. The liquid chlorine feed pump is equipped with 4-20mA controller, which could control the chlorine feed rate, based upon the output of the booster pumps. The pump is currently adjusted manually based upon the manual chlorine residual testing performed by the operators throughout the distribution system. This work does not appear to have been professionally engineered or formally permitted by ADEQ.
- Staff's understanding of the difference in the effective chlorine dose and potential interference with effective residual chlorine, the old tablet disinfection method compared to the new liquid disinfection system, will be important to achieve and maintain full microbiological compliance and proper chemical application protocols in all areas of the water system.

- Since liquid chlorine is now used, which has a published concentration of 12.5% active sodium hypochlorite, it is recommended that a QA/QC protocol be established to verify the active sodium hypochlorite concentration when fed into the system. Sodium hypochlorite concentration can vary due to age and temperature, which will affect the disinfection capacity of the solution and can result in lower disinfection effectiveness in the distribution system.
- Dedicated sampling locations for ten (10) regulatory compliance samples per month must be outlined in an official sampling plan submitted to ADEQ. City staff has ordered dedicated sampling fixtures that will be installed throughout the system. These sampling devices are designed to provide a more representative sample and avoid incidental contamination, which may have occurred in the past at other non-dedicated sampling locations.
- The City is establishing twenty (20) dedicated sampling locations to be used for regulatory compliance. These must be representative of the water systems compliance for all regulatory parameters. Review of the water distribution system will enable the City to select representative locations for regulatory compliance sampling. The selection of the regulatory compliance sampling locations should consider the hydraulic characteristics of the distribution system. The Domestic Water Distribution System Hydraulic Modeling Report dated September 2011 is an excellent source for determining the most representative sample locations for regulatory compliance and system operation.
- This City has numerous water system operational staff that collects the water system compliance samples and prepares the official compliance reports. These staff has received specific training from Rural Water on compliance sampling.
- The City is monitoring the free residual chlorine and combined residual chlorine in the water system.
- There is an informal water system flushing program that is used to primarily respond to customer water quality complaints.
- Bank erosion was observed at some Water Storage Tank sites that should be reviewed by a structural engineer and monitored to ensure stability of the water storage tank foundations.
- Corrosion was noted in some water storage tank overflow pipes.

Specific Observations

Cutter Booster Station

- The old chlorine tablet feed unit is still available for service.
- Noted incomplete coating and rusting components.
- A new liquid chlorine feed has been installed by staff. It was unclear how the new liquid chlorine feed system is controlled.
- Noted chemical feed pump sitting on a wooden block with temporary electrical and control wires.
- Noted incomplete coating in main booster pump station.
- Noted open flange to well discharge storage tanks that feeds water to main booster pump station. This is a potential source of contamination.

Well #2

- Noted incomplete coating at well and sediment trap.

- Noted use of salvaged 55 gallon drum used to feed mineral oil.
- Noted poor housekeeping in the Well #2 storage shed.
- Liquid chlorine now used by staff for disinfection of the Water System which has 12.5% active sodium hypochlorite. Chlorine is currently received from the supplier in 55 gallon drums.

Well #5

- Noted use of salvaged 55 gallon drum for mineral oil.
- It was reported that Well #5 has high-power costs and relatively low water production capacity.
- Noted excessive mineral oil at the pump base as well as weeds within the well site.
- The electrical building wooden roof support beams appear to have incomplete protective coating and minor water damage.

Well #4

- Noted use of salvaged 55 gallon drum for mineral oil.
- Noted incomplete coating on well discharge piping and excess oil residue on well pump and motor, as well as weeds within the well site.

Well #3

- Noted use of salvaged 55 gallon drum for mineral oil.
- Noted incomplete coating on well discharge piping and excess oil residue on well pump and motor, as well as weeds within the well site.

Well #1

- Noted Submersible Well Pump and Sedimentation Trap with incomplete coating on sedimentation trap and well discharge piping as well as weeds within the well site.

Water Truck Loading Station

- It was reported that this filling station is not used. Although the valve in the ground has been closed this open fill station is a potential exposure to contamination.

Booster Station below the Middle School

- Noted weeds at the site.

Booster Station Serving Crestline Area

- Noted that the exterior water line serving outside landscaping is used for a sampling location.
 - If this location is used for an official sampling location, the vacuum breaker with screen has the potential for contamination, leading to a non-representative sample.
- It was noted that one (1) booster pump is out of service or repair.
- There was incomplete coating on piping.

Crestline Water Storage Tank

- There were loose wires or cables hanging from storage tank.
- Noted weeds within the site.
- Corrosion was noted in the overflow pipe of the storage tank. Noted some bank erosion that should be monitored to ensure stability of the water storage tank foundation.

Booster Station at Crestline Water Storage Site

- Noted proper cleanliness in the booster station. This station is a good example of properly maintained water facility.

- Noted some incomplete coating following booster pump inlet pipe repair. Following the repair a spare part was left on the floor near the booster pump.

Thompson 1 Water Storage Tank

- This is a very small storage tank that is located near a bed-and-breakfast.

Flushing Line at a Dead End

- Noted a makeshift flushing pipe on a deadend waterline near the County Fairground. This open line is a potential source of contamination.

Apache Peaks Water Storage Tank and Booster Station

- Noted weeds within the site and incomplete coating, as well as a flexible line that may be a potential source of contamination.

Storage Tank and Booster Station

- Noted weeds within the site.

Arlington Water Storage Tank

- There is a direct interconnect waterline between the Arizona Water Company system and the City of Globe water system, without any apparent back flow prevention equipment. This is a potential source of contamination for both systems.
- It is not clear if there is proper back flow protection, nor how the water is metered when the interconnect is opened.
- Noted weeds within the site.
- Noted some bank erosion that should be monitored to ensure stability of the water storage tank foundation.

Ice House Canyon Booster Station

- Noted excess oil and incomplete coating on booster station equipment
- This station operates at extremely high pressure. Pump efficiency and pressure set point monitoring are critical to conserve energy.

Ice House Canyon Water Line

- The Water District has a direct interconnection with the City water system and operates at extreme pressure.
- Each meter is connected to the transmission line that fills the tank on the top of the mountain. Each meter has a pressure reducing valve before and after each meter, some pressures on this system are in excess of 200 psi.

Ice House Canyon Water Storage Tank

- Noted weeds within the site.

Old Hagen Water Storage Tank

- Elevation is consistent with other permanent storage tanks.

New Hagen Bolted Steel Water Storage (2) Tanks

- It was reported the elevation of the temporary storage tanks is higher than the rest of the water storage tanks in the system. If this is the case, it would result in the inability to fill the tanks completely, and reduces the effective and available capacity of these tanks.
- Noted incomplete coating on exterior piping and weeds within the site.

Wastewater Treatment Plant

Recommendations:

Immediate Actions

- In a wastewater treatment plant, the general public bases their opinion of the safety, reliability, and compliance of the facility, upon the things that they can see. It is critical that general housekeeping practices, maintenance of protective coating, as well as maintenance of grounds and buildings reflect the highest standard of care.

There were a number of areas observed during these site visits that do not reflect the appropriate standard of care, and should be addressed immediately.

- Many of the facilities used for storage are not well organized and may not have an accurate inventory.
 - The City should schedule personnel to organize and inventory all supplies and equipment.
- The equipment has incomplete protective coating.
 - The City should schedule personnel to apply protective coating, using the protective coating specification from the well #5 project.
- There was only one spare pump on-site for the Hologate lift station. Mr. Phillips advised that a spare of the second type of pump was going to be, or had been ordered.
 - All spare pumps and equipment should be in working order, so they are available for use should the primary equipment fail. Any out of service spare equipment should be repaired immediately.
 - It was noted that there was a manual basket to capture larger incoming debris to protect the pumps at the Hologate lift station. It is uncertain how frequently the basket is cleaned. This basket should be inspected daily, Monday through Friday, and cleaned as needed based upon the daily inspection.
- The grit removal system was not fully functional. The gear drive for the paddle mixer for the grit chamber was missing the motor. Staff communicated that the air lift was operational.
 - Grit removal is an important function at a wastewater treatment plant. This equipment should be repaired immediately.
- The hour meters for all three (3) blowers were accumulating time on their hour meters even though only one blower was operating.
 - This is a minor item; however it represents another potential problem in the facility that could result in failure of the treatment process, or exceeding the discharge permit.
 - One of the SAM unit's mixer component is not functioning and is only distributing air. The air flow control valve on this airline drop is not functional. Therefore the air flow cannot be adjusted.

vectors and birds that could spread disease. This material should be removed on a daily basis, under the normal course of operation.

- Staff indicated that grease haulers dump their waste directly into the drying bed and that septage loads are unloaded in a manhole upstream of the headworks equipment.
 - The City should review their pretreatment ordinance and policies relating to the receipt of liquid nonhazardous waste from grease traps and septage tanks. There may also be other commercial facilities in the City that are contributing to the significant scum buildup in the treatment plant. The City should consider developing a properly designed treatment process for the treatment of grease traps and septage tanks if the City determines it's in the best interest of the community to continue to receive nonhazardous liquid waste of these types.
 - Discharging untreated, grease trap wastes, which could also be mixed with septage into an unlined drying bed, could result in the release of contaminants to the groundwater. The City should modify their practices of receiving grease and septage at this facility until proper treatment process units are available.
- There appeared to be no equipment in service, or in place, that would provide directional flow in the oxidation ditch.
 - An oxidation ditch is designed to have a mixing velocity which will not allow anything to settle in the bottom of the basin. In addition, the biological treatment process requires mixing to properly treat the wastewater entering the facility.
 - The City should aggressively move forward to remove the debris and nonfunctioning equipment from the oxidation ditch and install proper mixing and aeration equipment that are designed for an oxidation ditch.
- The mechanical manual controlled outlet weir that controls the level of the oxidation ditch was said to be inoperable.
 - The outlet control gate weir is an important operational feature in the oxidation ditch and should be repaired to enable the operator to adjust levels in the oxidation ditch and remove floating material.
- There were 150 pound cylinders on site that were not chained to the wall in the chlorine room, although there was a chain and hardware on the wall to secure the cylinders.
 - This is an immediate health and safety issue. All 150 pound cylinders must be securely chained to avoid injury to plant personnel.
- There was a water mist fire extinguisher found in the chlorine room. This was communicated to the City manager later in the day and the extinguisher was removed by EUSI, with Kent as a witness, from this room and placed in the operator office.
 - Proper fire extinguishers should be used in all areas of the facility. It is recommended that the fire department conduct a fire safety inspection at the facility as soon as possible.
- The chlorine residual analyzer had power, however it did not appear to be operational nor was it controlling the feed rate of the chlorine via the 4 to 20 ma signal which the system

seemed intended to operate under. The chlorine feed rate was being manually controlled. It is not clear where the residual analyzer would get its supply water to read the chlorine residual as there is not a chlorine contact basin at the facility.

- Although it is acceptable to use an outfall pipe as a chlorine contact chamber, it makes it difficult for plant staff to control the chlorine residual, to ensure an effective disinfection of the treated effluent.
- The City should engineer a proper chlorine contact process unit that enables the plant staff to control the chlorine feed rate automatically with the equipment the city already owns. The current practice of manually feeding chlorine results in under feeding chlorine during high flow conditions and overfeeding chlorine during low flow conditions. Automating the chemical feed will enable the plant staff to more effectively manage the chlorine dosage and thereby facilitate the management of the dechlorination chemical.
- The water pressure gauges were in disrepair and non functional.
 - The water pressure gauges pressure readings are important to know to ensure that there is adequate water flow to support the vacuum which is required by the chlorinator. This should be repaired as soon as possible.
- The dechlorination system chemical barrel was found to be empty at the time of the observation.
 - Although it is acceptable to use an outfall pipe as a dechlorination contact chamber, it makes it difficult for plant staff to control the de-chlorination process, to ensure an effective dechlorination of the treated effluent.
 - The City should engineer a proper contact process unit that enables the plant staff to control the dechlorination chemical feed rate automatically. The current practice of manually feeding dechlorination chemical results in under feeding chemical during high flow conditions and overfeeding it during low flow conditions. Automating the chemical feed will enable the plant staff to more effectively manage the chemical dosage and thereby facilitate better management of the dechlorination chemical.
 - Installing a backup chemical feed system will enable the plant staff to maintain chemical feed when the plant is unattended.
- The chemical feed pump was plugged in and attempting to pump. Air was in the suction tubing and in the discharge tubing. There was no chemical being fed at the time of the observation.
 - Establishing a Standard Operating Procedure (SOP) to ensure that the chemical supply and the chemical feed pump is working properly is essential to ongoing permit compliance. Operator check sheets that are dated and initialed are a common practice to verify that critical treatment plant units have been serviced.
- There appears to be very short contact time from the point of injection to the point of discharge. However, there is a fair amount of fall in the pipe and it appears that there may be adequate mixing.

- The discharge pipe was covered and not visible as the gravel and silt had refilled the area.
- The manhole where the chemical was being fed was very dirty with lots of debris on the sidewalls from where the manhole had surcharged in the past.
 - The City should engineer an appropriate outfall and contact chamber with headwall that will protect the official compliance sampling and discharge point.
- The entry door for the chemical feed building was damaged and very difficult to open. This door should be repaired to allow for ease of entry for the operators.
 - Equipment damage and repair work order forms should be made available for plant staff to enable management to properly allocate the necessary resources to repair damaged equipment and facilities. This can also serve as an effective tool for training personnel in ways to more safely perform their duties.
- There was no evidence of an automatic sampler at the point of discharge. There is what appeared to be a brand new unit in the lab at the operations building. It does not appear that this is used to collect the composite compliance samples at the point of discharge.
 - The AZPDES permit requires composite samples for a number of the regulated parameters. Although a composite sample can be selected by hand, it is unlikely that this is practical for a facility which is not staffed around-the-clock. Since the City owns an automatic sampler, it is recommended that this unit be utilized for compliance sampling purposes.
- Grab or discrete samples that are required under the AZPDES permit for pH and for Total Residual Chlorine (TRC) should be run in the laboratory.
 - In March 2011, ADHS identified a number of deficiencies relating to laboratory practices. Among them were the statutory requirements for practices and procedures utilized for pH and total residual chlorine. In addition, the discharge permit stipulates requirements for ultra low level total residual chlorine test procedures must be followed. The City needs to immediately implement the approved sampling and testing requirements identified by ADHS.
 - The TRC sample was reported to be collected and run at the point of discharge. The analyzer is taken into the field and staff used it there based upon the 15 minute testing window.
 - This analysis must be performed in the laboratory following proper protocols, and with the approved apparatus. This analysis cannot be performed in the field.
 - There did not appear to be the proper apparatus to accompany the DR 2800 analyzer to perform the ultra low chlorine residual as required. It is understood that this analyzer has been sent out for calibration as it was not on site.
 - It did not appear that the proper sample collection bottle was on site to ensure preservation of the sample prior to completing the analysis.

- The City has requested EUSI to provide a list of laboratory equipment needed to properly perform this analysis. EUSI provided this information. April 18, 2013 via email.
- It was unclear where the Whole Effluent Toxicity (WET) test sample is collected.
 - It is critical that the WET test sampling and testing is done appropriately. The sample should be taken from a representative sample of the treated effluent downstream of all process units in accordance with the permit requirements.
- The general housekeeping in the operations building needs improvement and lacked organization and cleanliness.
- It appeared that there was a confined space tripod on site. There was no evidence of an air monitor, necessary for entering confined spaces for repairs or inspection.
 - City staff should be properly trained and equipped relating to confined space entry. In many cities the fire Department can provide this type of training. It is recommended that the City safety officer review the safety equipment at the facility and procure the proper equipment and schedule the proper training.
- Staff was able to provide a copy of the Arizona Pollution Discharge Elimination System (AZPDES) Permit and the grease ordinance; however they were not able to provide a copy of the Aquifer Protection Permit (APP).
 - All official permits should be in an appropriate and accessible location at the treatment facility.
- The operators utilize a simple daily check sheet on which flows, dissolved oxygen level in the oxidation ditch, and equipment hour meter data is recorded.
 - A more complete operations log should be developed that would enable better records of facility operation and maintenance, as well as provide a complete history of facility operation. This can also be important to demonstrate regulatory compliance.
- There did not appear to be a laboratory log sheet to record pH, chlorine residual, 30 minute settling, or other plant process data. There did not appear to be a Standard Operating Procedure manual or a lab QA/QC manual at the facility.
 - The ADEQ consent order and ADHS identified a number of deficiencies relating to laboratory practices. Among them were the lack of proper logs and QA/QC documentation. The City should establish proper laboratory logs as soon as possible.
- There did not appear to be a bound log book at the facility to record pertinent events or information from the day's activities.
 - A bound facility logbook is a very important record of activities at the facility that should be maintained on-site. It is recommended that the City purchase such a logbook as soon as possible and direct plant staff to note all pertinent activities at the facility.

Mid Term Actions

- There is one (1) Grade I operator at the plant with two (2) maintenance workers plus Mr. Philips a Grade IV operator, who is serving as the ADEQ Certified Operator of Record.
 - The City should undertake measures to advance existing wastewater treatment plant personnel to a higher certification level or hire an operator with at least a Grade II level of certification. As the facility is a Grade III treatment plant, all personnel working at the facility should be at least a Grade II.
- The City should begin the planning process to design and implement improvements to the wastewater treatment plant that would achieve Best Available Demonstrated Control Technology (BADCT), which is the standard of the industry for a municipal wastewater treatment facility. To achieve this level of treatment at the facility, the City would likely need to upgrade the treatment facility to remove nitrogen and to provide for post filtration of the treated effluent. If the facility can produce A+ quality of effluent, the treated water could become a viable resource for the community.

General Observations

- The facility was producing a good quality effluent.
- The general housekeeping of the facility is poor.
- There are numerous equipment and process systems that are out of service or not operational.

Specific Observations

Holegate Lift Station:

- Noted poor housekeeping and weeds within the site.
- Perimeter fence in good condition, facilities were locked up and secure.
- Two different types of submersible pumps are being utilized, one in the primary wet well and one in the secondary wet well.
- Mr. Phillips advised that a spare for the second type of pump was going to be, or had been ordered.
- Noted there was an operator check list on-site in the building with run times for each of the lift station pumps.
- It was noted that there was a manual basket to capture larger incoming debris to protect the pumps. It is uncertain how frequently the basket is cleaned.
- There is a propane powered back-up generator.

Wastewater Treatment Plant:

- There is one (1) Grade I operator at the plant with two (2) maintenance workers plus Mr. Philips a Grade 4 operator, who is serving as the ADEQ Certified Operator of Record.
- Influent screen was operational and appeared to be removing debris properly.
- Influent flow is measured by an ultrasonic flow meter.
- The grit removal system was not fully functional. The gear drive for the paddle mixer for the grit chamber was missing the motor. Staff communicated that the air lift was operational.
- The grit conveyor was functional and removing debris from the system.
- Poor general housekeeping was noted in this area, there was a large accumulation of broken Styrofoam cups floating in the influent channel downstream of the headworks equipment.
- There were three (3) centrifugal blowers which supply process air to the oxidation ditch which all appeared to be functional, only one blower was running while at the facility.
- The hour meters for all three (3) blowers were accumulating time on their hour meters even though only one blower was operating.
- There are four (4) submersible aerator mixers (SAM) in the oxidation ditch. They receive air from the blowers and provide mixing and aeration for the treatment process.
 - One of the SAM unit's mixer components is not functioning and is only distributing air.
 - The air flow control valve on this airline drop is not functional; therefore the air flow cannot be adjusted.
 - The other three (3) SAM units appeared to be operational.
- There was a significant accumulation of foam/scum/debris on the surface of the oxidation ditch.
- There appeared to be no equipment in service, or in place, that would provide directional flow and mixing as an oxidation ditch designed to circulate to keep settleable material in suspension. This results in greatly reduced operational capacity of the treatment process.
- The mechanical manual controlled outlet weir that controls the level of the oxidation ditch was inoperable. This precludes the operator from effectively controlling the level in the oxidation ditch or removing floating scum and debris.
- Both clarifiers were in operation.
- The #2 clarifier, which has recently been rehabilitated, appeared to have weirs that were not level and uniform and the flow split between the clarifiers did not appear balanced. This reduces the operational capacity of the clarifiers.
- The Return Activated Sludge and Waste Activated Sludge pumps appeared to be fully serviceable and were operational.

- Staff indicated that they waste raw sludge to the drying beds for about one (1) hour each day to manage the process. The biological process is operated based upon controlling the amount of active biomass in the system. Typically a facility of this size would calculate wasting volumes and know precisely how much sludge must be removed from the process each day.
- One of the five drying beds was recently cleaned, staff communicated that dried sludge is buried on-site in a designated area in accordance with the permit.
- It was reported that none of the drying beds, nor the on-site sludge burial area are lined. This can result in the release of contaminants to the groundwater. Since the monitoring well for the treatment facility is down gradient of these areas, there is a potential for leaching contaminants into the soil that would show up in the monitoring well.
- Staff indicated that grease haulers dump their waste directly into the drying bed and that septage loads are unloaded in a manhole upstream of the headworks equipment. Staff did not present any documentation relating to the delivery of grease or septage at the facility.
- Disinfection is currently accomplished with the use of gaseous chlorine in 1 ton cylinders.
 - One cylinder was empty, the other was online.
 - Both scales were functional and displaying a weight.
 - The vacuum system which draws the chlorine from the cylinder(s) was operational and the rotometer indicated a feed rate of about 30lbs/day.
 - There were 150 pound cylinders on site as well; these cylinders were not chained to the wall, although there was a chain and hardware on the wall in place to secure the cylinders. Chlorine cylinders are required to be securely chained for safety purposes.
 - The automatic fan and lights did function when the door opened.
 - There was a water mist fire extinguisher found in the chlorine room. A water mist fire extinguisher is not appropriate for a chlorine room. This was communicated to the City manager later in the day and the extinguisher was removed by EUSI, with Kent as a witness, from this room and placed in the operator office.
 - The chlorine residual analyzer had power, however it did not appear to be operational, nor was it controlling the feed rate of the chlorine via the 4 to 20 ma signal which the system seemed intended to operate under. The chlorine feed rate was being manually controlled. It is not clear where the residual analyzer would get its supply water to read the chlorine residual as there is not a chlorine contact basin at the facility.
 - Staff kept the ammonia in the lab out of the chlorine room. Ammonia is used to check for chlorine leaks when changing the cylinders.
 - The water pressure gauges were in disrepair and non functional.

- The dechlorination system is located off site about 100 feet upstream from the point of discharge in the bottom of the wash.
 - The chemical barrel was found to be empty at the time of the observation.
 - The chemical feed pump was plugged in and attempting to pump. Air was in the suction tubing and in the discharge tubing. There was no chemical being fed at the time of the observation.
 - There was no secondary containment for either of the chemical barrels in the building.
 - The chemical feed pump appears to be operated in manual mode, which can result in overfeeding chemical during low flow conditions and under feeding chemical during high flow conditions.
- There appears to be a very short contact time from the point of injection to the point of discharge. However, there is a fair amount of fall in the pipe and it appears that there may be adequate mixing.
- The discharge pipe was covered and not visible as the gravel and silt had refilled the area. This is been deficient issue pointed out by ADEQ in previous inspections.
- All manholes were secure and the chemical feed building was secure.
- The entry door for the chemical feed building had been damaged and is very difficult to open. This door should be repaired to allow for ease of entry for the operators.
- The dechlorination chemical is made by the operators using a granular dry concentrated “Vita-D-Chlor”. They add some water to the bottom of the barrel and then add 8 scoops of the dry chemical and mix it up then finish filling the barrel with water and take it down to the building for addition to the effluent discharge. There were no safe provisions for handling the chemical barrel.
- The manhole where the chemical was being fed was very dirty with lots of debris on the sidewalls from where the manhole had surcharged in the past.
- The monitor well that is just down from the point of discharge was said to be dry and only about 40’ deep or so.
- The monitoring well where the groundwater samples are collected is said to be about 115 feet deep. Depth to water was indicated to be about 96’ below ground surface.
- Sampling procedure from the monitoring well was described as utilizing a portable generator and a submersible sampling pump that is run for about 5 minutes prior to collecting the samples. It is unclear if this procedure purges the well adequately to get a representative sample.
- There was no evidence of an automatic sampler at the point of discharge. There is what appeared to be a brand new unit in the lab at the operations building. It does not appear that this is used to collect the required composite compliance samples as required under the permit, at the point of discharge.

- Grab or discrete samples that are required under the AZPDES permit are for pH and for Total Residual Chlorine (TRC). These samples should be run in the laboratory.
 - The TRC sample was reported to be collected and run at the point of discharge. The analyzer is taken into the field and staff use it there based upon the 15 minute testing window.
 - There did not appear to be the proper apparatus to accompany the DR 2800 analyzer to perform the ultra low chlorine residual as required under the permit. It is understood that the DR 2800 analyzer has been sent out for calibration as it was not on site.
 - It did not appear that the proper sample collection bottle was on site to ensure preservation of the sample prior to completing the analysis.
 - The pH sample is collected then brought back to the lab for analysis. It is understood that staff calibrate the pH meter with 3 buffers and then with a second source 7.0 pH buffer before each use of the meter.
- It was unclear where the Whole Effluent Toxicity (WET) test sample is collected.
- The general housekeeping in the operations building needs improvement. There lacked organization and cleanliness.
- It appeared that there was a confined space tripod on site. There was no evidence of an air monitor, necessary for entering confined spaces for repairs or inspection.
- Staff was able to provide a copy of the Arizona Pollution Discharge Elimination System (AZPDES) Permit and the grease ordinance; however they were not able to provide a copy of the Aquifer Protection Permit (APP).
- The operators utilize a simple daily check sheet on which flows, dissolved oxygen level in the oxidation ditch, and equipment hour meter data is recorded.
- There did not appear to be a laboratory log sheet to record pH, chlorine residual, 30 minute settling, or other plant process and regulatory permit data.
- There did not appear to be a bound log book at the facility to record pertinent events or information from the day's activities.
- There did not appear to be a Standard Operating Procedure manual or a lab QA/QC manual at the facility.