Verde Glen DWID
Operations & Maintenance Manual

Location: Verde Glen 1

Date: April 2025

Prepared by: David Owens

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Appendix A – Field Log Templates

Daily Operations Log

Date: _____

Chlorine Residual: _____ mg/L

Well Run Time (hrs): _____

Tank Level: _____

Notes: _____

Maintenance Log

Date: _____

Equipment Serviced: _____

Description of Work: _____

Parts Used: _____

Performed By: _____

Sampling Log

Date: _____

Sample Type: [ ] Bacteria [ ] Nitrate [ ] Other: _____

Location: _____

Results: _____

Lab: _____

Water Utility Operations & Maintenance Manual

1. Introduction

Utility Name: Verde Glen Domestic Water Improvement District (DWID)

Location: Payson, AZ

Purpose of the Manual:
This Operations & Maintenance (O&M) Manual provides guidance and standardized procedures for the effective operation, maintenance, and management of the Verde Glen DWID water system. It ensures regulatory compliance, promotes system longevity, and serves as a reference for both daily operations and emergency situations.

Key Personnel Contacts:

- Operations Manager: Ben Rowe Operator ID #OP035543 — 1-928-595-0037

- Maintenance Supervisor: [TBD]

- Emergency/After-Hours Contact: David Owens — 602-909-0333

- Board President: David Owens — 602-909-0333

System Overview:

- Population Served: 48 service meters

- Water Source(s): One groundwater well, 568 deep, producing 13 gallons per minute (gpm). 3200 gallons per day. Peak Summer demand is 6400 gallons per day.

- Treatment Processes: Chlorination

- Storage Facilities: Two 10,000-gallon storage tanks. Assuming each tank is 80% full, it would give us 16,000 gallons of storage

- Distribution System: Combination of ABS piping, PVC Schedule 40 piping, and galvanized piping

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2. System Overview

A. Water Source

- Type: Groundwater well total gallons of water sold between September 2022 – August 2023 was 1,164,410 gallons

- Depth: 568 feet drilled in 1962

- Capacity: 12 gallons per minute (gpm)

- Location: Verde Glen 1

- Well Identification/Tag Number: 55-641886

- Pump Info: Submersal 220V

- Water Rights or Permit Info: According to the adjudication of December 2022, it appears we have a cone of influence and do not fall under the de minimis rule and therefore our water rights would fall under predecessor ownership.

B. Treatment Process

- Type: Chlorination

- Equipment: Liquid feed chlorinator

- Monitoring: Manual chlorine residual checks

- Target chlorine residual: [TBD — typically 0.2–1.0 mg/L]

C. Storage

- Tanks: Two 10,000-gallon steel storage tanks

- Location: Verde Glen 1

- Material: Steel

- Age/Install Year: 2002

- Overflow Protection: [TBD]

D. Distribution System

- Pipe Types: ABS, PVC Schedule 40, galvanized

- Pipe Sizes: 2-4 inch

- Approximate Length: 8,000 feet

- Valves, Hydrants: Assorted galvanized PVC and copper

- Pressure Zones or PRVs: None

- SCADA Monitoring: Not used; system is operated manually

3. Operating Procedures

A. Normal Operations

- Check well pump function and run time daily
- Inspect liquid feed chlorinator and refill chemical as needed
- Perform manual chlorine residual testing at designated sample locations
- Check tank levels visually or with float indicators
- Inspect system for leaks, pressure loss, or unusual sounds
- Maintain logbook of readings and observations

B. Startup Procedures

- Confirm power supply to well pump and chlorinator
- Open all necessary valves from source to tanks
- Prime chlorinator and start feed pump
- Open distribution valves slowly to repressurize system
- Monitor chlorine residual and pressure during startup
- Notify customers if system was previously offline

C. Shutdown Procedures

- Close inlet valve to storage tanks
- Power down chlorinator and well pump
- Bleed pressure at highest point or hydrant
- Document reason for shutdown and expected restart timeline

D. Seasonal Adjustments

- Winter: Insulate exposed piping, especially galvanized and fittings

- Summer: Increase monitoring of chlorine levels due to higher demand and warmer temps
- Adjust chlorination feed rates seasonally based on usage patterns

E. Emergency Operations

- Power Outage:
- - Deploy portable generator if available
- - Prioritize water use for health and safety
- Water Main Break:
- - Isolate section using valves
- - Notify affected residents
- - Flush and sample line after repair
- Low Chlorine Residual:
- - Increase feed rate
- - Resample after 30 minutes
- - Report persistent low readings to operator-in-charge
- Pump Failure:
- - Switch to backup pump if available
- - Contact pump technician
- - Notify board and key personnel

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4. Maintenance Procedures

A. Daily / Weekly Maintenance

- Check well pump operation and pressure
- Inspect and refill chlorine solution tank
- Record chlorine residuals at designated sampling point
- Visually inspect storage tanks for leaks or overflow
- Walk system for signs of mainline leaks or unusual pressure drops
- Log water production, chlorine dosage, and meter readings

B. Monthly Maintenance

- Flush dead-end lines or low-use areas to maintain water quality
- Clean and inspect chlorinator components
- Verify function of float/level sensors in tanks
- Exercise isolation valves to prevent seizing

- Inspect galvanized and exposed piping for corrosion or cracking

C. Quarterly / Semiannual Maintenance

- Pressure test distribution lines in sections (if feasible)
- Check and clean tank vent screens and overflow drains
- Verify chlorine feed calibration with volume check
- Lubricate motor bearings if applicable
- Check for sediment buildup in tanks or at sample stations

D. Annual Maintenance

- Full system inspection, including all visible pipe, valves, tank coatings
- Chlorinator rebuild or replacement parts if manufacturer recommends
- Electrical inspection on pump, controls, and panel
- Safety review: update lockout/tagout instructions, replace PPE if worn
- Review past maintenance logs for trends or failures

E. Corrective Maintenance

- Repair or replace failed valves, leaks, or corroded fittings
- Chlorinate and flush after repairs per ADEQ protocol
- Document failures, response time, and resolution
- Restock spare parts used (valves, seals, pipe sections)

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5. Equipment & Infrastructure Data

A. Well Pump System

- Pump Type: [e.g., Submersible or line shaft]
- Horsepower (HP): [TBD]
- Flow Rate: 12 gpm
- Pump Controller Type: [e.g., VFD, DOL, pressure switch]
- Pump Manufacturer / Model: [TBD]
- Install Date / Last Service Date: [TBD]
- Power Source: [e.g., 220V single phase, generator backup available in Verde Glen 1 and not in Verde Glen 2]

B. Chlorination System

- Type: Liquid feed chlorinator
- Feed Pump Model: [TBD]

- Chemical Used: Sodium hypochlorite (bleach)
- Dosage Rate (typical): [e.g., 1–2 ppm target]
- Residual Test Kit Used: [TBD—e.g., Hach, Taylor, etc.]

C. Storage Tanks

- Number of Tanks: 2
- Tank Size: 10,000 gallons each
- Material: Steel
- Coating Type (if any): [TBD—epoxy, lined, etc.]
- Tank Location(s): Verde Glen 1
- Inspection Schedule: [e.g., annual visual + 5-year structural inspection]

D. Distribution Infrastructure

- Pipe Materials: ABS, PVC Schedule 40, galvanized
- Pipe Sizes: 2", 4"
- Approximate Total Length: 8,000 feet
- Number of Isolation Valves: [TBD]
- Number of Hydrants (if any): [TBD]
- Pressure Zones / PRVs: Need to be installed on Verde Glen 3 due to excessive pressure.

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6. Safety & Compliance

A. Operator Certification

- All water system operators must maintain valid Arizona Department of Environmental Quality (ADEQ) certification appropriate to the system class.
- Certificates should be displayed at the site or kept in the system file.
- Continuing education and renewal requirements must be monitored annually.

B. Chemical Handling

- Sodium hypochlorite (liquid bleach) must be stored in a designated, ventilated chemical area.
- Operators must wear gloves and eye protection when mixing or refilling the chlorinator.
- Secondary containment and spill cleanup materials should be available.
- Never mix bleach with other chemicals—especially acids.

C. Personal Protective Equipment (PPE)

- Required PPE includes gloves, safety glasses, and steel-toe boots.

- For confined space or electrical work, additional PPE such as respirators or arc flash gear may be required.
- PPE should be inspected regularly and replaced if worn or damaged.

D. Lockout / Tagout

- Equipment such as the well pump and chlorinator must be locked out during maintenance.
- Operators must follow a lockout/tagout procedure to prevent accidental energization.
- Tags must indicate the person responsible and date/time of lockout.

E. Confined Space Entry

- Storage tanks and underground vaults are considered confined spaces.
- Entry requires a confined space permit, gas monitoring, and a two-person team.
- All confined space procedures must meet OSHA standards (29 CFR 1910.146).

F. Water Quality Sampling & Reporting

- Chlorine residual must be tested daily and logged.
- Monthly bacteriological samples must be taken from approved sites and submitted to a certified lab.
- Annual Consumer Confidence Reports (CCRs) must be prepared and distributed.
- Records must be kept for all testing, maintenance, and public notifications.

G. Emergency Preparedness

- Maintain an emergency contact list (operators, vendors, local fire and health departments).
- Post response procedures for power failure, contamination, or major leaks.
- Train staff on emergency protocols annually.

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7. Recordkeeping

A. Daily Logs

- Chlorine residuals must be recorded daily, along with the operator's initials.
- Well run-time hours and daily water production (if metered) should be logged.
- Tank levels and system pressure (if monitored) must be noted.

B. Maintenance Logs

- All preventive and corrective maintenance must be recorded, including:

- - Date and time
- - Description of service
- - Equipment or part ID
- - Name of operator or contractor
- Maintenance logs should be reviewed monthly by the operator-in-charge or board.

C. Sampling and Water Quality Reports

- Retain all lab reports for:
- - Monthly bacteriological sampling
- - Nitrate and arsenic testing
- - Disinfection byproducts (if applicable)
- ADEQ requires sample records to be kept for at least 5 years.
- Chain-of-custody forms must be included in the file.

D. Emergency Events

- Document all service interruptions, main breaks, and emergency responses.
- Include:
- - Start and end time
- - Cause
- - Action taken
- - Notification records (e.g., customer notices, calls to ADEQ)

E. Equipment and Inspection Records

- Maintain records of:
- - Chlorinator service/rebuilds
- - Well pump testing
- - Tank inspections (internal/external)
- - Valve exercising logs
- Use photos when possible for visual inspection reports.

F. Digital and Physical Storage

- Records may be stored in paper binders at the treatment site or utility office.
- Digital backups (PDF scans or spreadsheets) are strongly recommended and should be password-protected.
- All records must be accessible upon request by ADEQ or the public under Arizona's Open Records Law.