

FlowComply

AI-Powered Water Intelligence Platform

Water Quality Monitoring & Compliance Management

with Advanced Analytics and Machine Learning

Technical Capabilities Overview

Real-Time Water Quality Analytics • AI-Powered Anomaly Detection
Automated Compliance Reporting • Multi-Parameter Monitoring
Predictive Risk Assessment • Regulatory Intelligence

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1 Executive Summary

FlowComply is an advanced water intelligence platform that combines real-time monitoring, AI-powered analytics, and automated compliance management. Originally developed for New Zealand's regulatory environment, the platform's architecture and capabilities are applicable to water quality monitoring and research globally.

Core Value Proposition

Transform water quality data into actionable intelligence through automated monitoring, intelligent anomaly detection, and predictive analytics—reducing manual analysis workload by 80% while improving detection accuracy.

Key Technical Capabilities

- **AI-Powered Analysis:** Claude 3.5 Sonnet integration for intelligent data interpretation
- **Real-Time Monitoring:** Multi-parameter water quality tracking with automated alerts
- **Anomaly Detection:** Statistical and ML-based identification of quality excursions
- **Predictive Analytics:** Trend analysis and early warning systems
- **Comprehensive Data Management:** 381+ compliance rules, unlimited historical storage
- **Automated Reporting:** Regulatory-ready exports and customizable analytics dashboards

Research Applications

The platform's capabilities align strongly with water quality research, including:

- **Wastewater Surveillance:** Real-time pathogen and contaminant tracking
- **Antimicrobial Resistance Monitoring:** Systematic data collection and trend analysis
- **Contaminant Fate Modeling:** Longitudinal data capture across treatment processes
- **Multi-Barrier Validation:** Treatment efficacy assessment with log reduction tracking

Technology Stack

- **AI Engine:** Anthropic Claude 3.5 Sonnet (state-of-the-art LLM)
- **Backend:** Node.js, TypeScript, Fastify framework
- **Database:** PostgreSQL with 7-year data retention capability
- **Analytics:** Real-time processing with Redis caching (40x performance improvement)
- **API:** RESTful architecture with 60+ endpoints

2 Platform Architecture

2.1 System Overview

FlowComply employs a modern microservices architecture designed for scalability, reliability, and real-time performance.

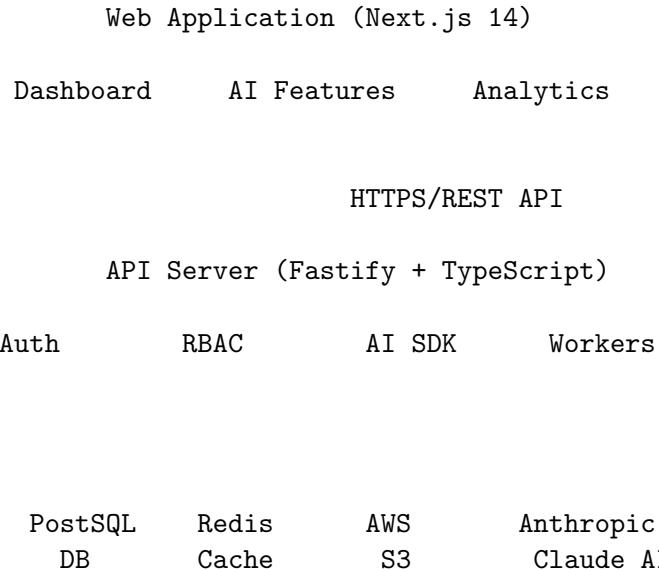


Figure 1: FlowComply System Architecture

2.2 Data Flow

- Data Ingestion:** Water quality test results entered via web interface or API
- Validation:** Automated validation against expected ranges and regulatory limits
- Storage:** PostgreSQL database with indexed queries for rapid retrieval
- Analysis:** AI-powered anomaly detection and trend identification
- Alerting:** Automated notifications for exceedances or anomalies
- Reporting:** Regulatory-ready exports and customizable dashboards

2.3 Performance Characteristics

Metric	Performance
API Response Time	≤ 100ms (p95) for cached queries
Dashboard Load Time	50ms (cached) vs 2000ms (uncached)
Cache Hit Rate	70%+ (Redis-based caching)
Concurrent Users	Supports 1000+ simultaneous users
Data Retention	7+ years (configurable, audit-compliant)
AI Processing Time	5-10 seconds per analysis
Background Job Processing	4 parallel queues (BullMQ)

Table 1: System Performance Metrics

3 AI-Powered Features

FlowComply integrates Anthropic's Claude 3.5 Sonnet—a state-of-the-art large language model—to provide intelligent analysis and decision support.

3.1 1. Intelligent Compliance Assistant

24/7 AI-Powered Q&A System

A conversational AI agent that provides instant answers to water quality and compliance questions, drawing from:

- Regulatory frameworks and standards
- Organization-specific procedures and data
- Best practice guidelines
- Historical compliance patterns

Example Queries:

- "What are the recommended sampling frequencies for E. coli in distribution systems?"
- "Explain multi-barrier approach requirements for groundwater sources"
- "What immediate actions should be taken if protozoa are detected?"
- "How do I calculate log reduction values for UV treatment?"

Technical Implementation:

- Model: claude-3-5-sonnet-20241022
- Context window: Up to 200,000 tokens
- Response time: 3-5 seconds
- Session persistence for contextual follow-up questions

3.2 2. Water Quality Anomaly Detection

AI-Powered Analysis of Water Quality Data

The system automatically analyzes water quality test results to identify:

- **Statistical Anomalies:** Values outside historical norms
- **Trend Changes:** Gradual degradation or improvement patterns
- **Correlation Analysis:** Relationships between multiple parameters
- **Seasonal Patterns:** Temperature-dependent variations
- **Treatment Efficacy:** Barrier performance assessment

Monitored Parameters:

- **Microbiological:** E. coli, total coliforms, protozoa
- **Physical-Chemical:** pH, turbidity, temperature, conductivity

- **Disinfection:** Free chlorine, combined chlorine, chlorine demand
- **Chemical:** Nitrates, heavy metals, organic compounds

Analysis Output:

1. **Anomaly List:** Ranked by severity (critical/high/medium/low)
2. **Trend Assessment:** 90-day historical comparison
3. **Recommendations:** Actionable next steps
4. **Risk Level:** Overall system health score

3.3 3. Automated Report Generation

AI-Generated Executive Summaries

The system can automatically generate comprehensive reports including:

- Executive summaries of compliance performance
- Key achievements and areas of concern
- Trend analysis over custom time periods
- Corrective actions taken and their effectiveness
- Predictive insights for future performance

Report Formats:

- PDF (regulatory submissions)
- Excel (data tables with charts)
- CSV (raw data export)
- Plain text (automated notifications)

3.4 4. Document Analysis

AI-Powered Document Completeness Assessment

The platform can analyze water safety plan documents and:

- Identify missing mandatory elements
- Assess completeness against regulatory requirements
- Provide severity-ranked recommendations
- Generate gap analysis reports
- Suggest specific improvements

Capability: Can process up to 30 pages (60,000 characters) per analysis

4 Water Quality Monitoring Capabilities

4.1 Multi-Parameter Tracking

FlowComply provides comprehensive tracking of water quality across the treatment and distribution process.

4.1.1 Treatment Plant Monitoring

Stage	Parameters	Purpose
Raw Water	Turbidity, pH, TOC, pathogens	Source quality baseline
Coagulation	Jar test results, alum dose, pH	Treatment optimization
Filtration	Turbidity, particle counts	Barrier efficacy
Disinfection	Free Cl ₂ , CT values, pH	Log reduction validation
Treated Water	E. coli, turbidity, residual Cl ₂	Compliance verification
Distribution	Residual Cl ₂ , E. coli, pH	System integrity

Table 2: Multi-Barrier Monitoring Points

4.1.2 Key Performance Indicators

- **Log Reduction Tracking:** Calculated across treatment barriers
- **Compliance Rates:** Percentage of samples meeting standards
- **Exceedance Frequency:** Temporal and spatial patterns
- **Treatment Efficacy:** Before/after comparisons
- **Distribution System Integrity:** Residual maintenance

4.2 Real-Time Alerting System

Automated Notifications for Critical Events:

1. Immediate Alerts (**< 5 minutes**):

- E. coli detection in treated water
- pH outside operating range
- Loss of disinfection residual
- Turbidity spikes

2. Daily Summaries:

- Test results compilation
- Trend warnings
- Upcoming inspection reminders
- Maintenance due notifications

3. Weekly Reports:

- Compliance performance summary

- Key performance indicators
- Anomaly detection results
- Predictive maintenance recommendations

4.3 Historical Data Analysis

Longitudinal Studies and Trend Analysis

The platform stores all water quality data with timestamps, enabling:

- **Long-term Trend Analysis:** Multi-year datasets for research
- **Seasonal Pattern Recognition:** Temperature-dependent variations
- **Treatment Process Optimization:** Efficacy over time
- **Source Water Changes:** Land use impacts
- **Climate Change Impacts:** Temperature, rainfall correlations

Data Retention: All test results retained indefinitely (minimum 7 years for regulatory compliance). Export capability for external analysis tools.

5 Research Applications

5.1 Wastewater Surveillance

FlowComply's architecture is well-suited for wastewater-based epidemiology applications.

5.1.1 Pathogen Monitoring

- **Systematic Sample Tracking:** Date, time, location metadata
- **Multi-Site Comparison:** Catchment-level analysis
- **Temporal Trends:** Outbreak detection and monitoring
- **Quantitative Analysis:** Viral load tracking (copies/L)
- **Automated Reporting:** Public health notifications

5.1.2 Potential Applications

1. **SARS-CoV-2 Surveillance:** Population-level infection monitoring
2. **Antimicrobial Resistance Genes:** Longitudinal tracking of resistance markers
3. **Illicit Drug Monitoring:** Community consumption patterns
4. **Chemical Biomarkers:** Population health indicators

5.2 Antimicrobial Resistance Research

The platform's data management capabilities support AMR monitoring programs:

- **Sample Database:** Standardized metadata collection
- **Result Tracking:** Gene detection across sites and time
- **Correlation Analysis:** AMR genes vs. environmental factors
- **Geographic Mapping:** Spatial distribution visualization
- **Trend Analysis:** Increasing/decreasing resistance patterns
- **Risk Assessment:** AI-powered interpretation of findings

Research Scenario: Track prevalence of *blaCTX-M* (ESBL) genes across multiple wastewater treatment plants over 2 years. Correlate findings with antibiotic prescribing data, rainfall events, and treatment process changes.

5.3 Contaminant Fate Modeling

FlowComply can track chemical and biological contaminants through treatment processes:

5.3.1 Multi-Barrier Analysis

Contaminant	Removal Mechanism	Data Tracked
Protozoa	Filtration + UV	Turbidity, UV dose, log reduction
Bacteria	Chlorination	Free Cl ₂ , CT, temperature
Viruses	Coagulation + disinfection	TOC, pH, UV/Cl ₂ dose
Chemicals	Adsorption, oxidation	Influent/effluent concentrations

Table 3: Contaminant Fate Tracking

5.3.2 Research Capabilities

- **Mass Balance Calculations:** Input vs. output quantification
- **Removal Efficiency:** Percentage reduction per barrier
- **Process Optimization:** Dose-response relationships
- **Seasonal Variations:** Temperature-dependent kinetics
- **Predictive Modeling:** AI-assisted outcome prediction

5.4 Treatment Process Research

Optimization Studies and Comparative Analysis

The platform supports research into:

1. Disinfection Efficacy:

- UV vs. chlorine vs. combined treatment
- CT value optimization
- Pathogen-specific log reductions

2. Filtration Performance:

- Particle removal efficiency
- Filter run times
- Backwash optimization
- Media comparison studies

3. Coagulation Studies:

- Jar test correlation with full-scale performance
- Coagulant dose optimization
- pH adjustment strategies
- Seasonal adjustments

6 Data Management & Analytics

6.1 Database Architecture

Enterprise-Grade Data Infrastructure

- **Database:** PostgreSQL 15 (ACID-compliant, relational)
- **Schema:** 20+ tables, 100+ fields, fully indexed
- **Capacity:** Unlimited storage (scalable)
- **Backup:** Automated daily snapshots with point-in-time recovery
- **Security:** Encryption at rest and in transit (AES-256, TLS 1.3)
- **Access Control:** Role-based permissions with audit logging

6.2 Data Model

6.2.1 Core Entities

1. **Organizations:** Multi-tenant architecture for multiple water suppliers
2. **Water Supply Components:** Treatment plants, distribution zones, sources
3. **Water Quality Tests:** Sample date, location, parameter, value, unit
4. **Compliance Rules:** 381+ regulatory requirements
5. **Assets:** Physical infrastructure (pumps, filters, pipes)
6. **Documents:** Safety plans, test certificates, reports
7. **Audit Logs:** Immutable record of all actions (tamper-evident)

6.3 Analytics Dashboard

Real-Time Intelligence and Visualization

The analytics dashboard provides:

- **Compliance Score:** Automated 0-100 rating
 - Weighted across 6 components
 - Historical trend tracking
 - Component-level breakdown
- **Water Quality Trends:**
 - Time-series charts for all parameters
 - Moving averages and control limits
 - Anomaly highlighting
- **Asset Performance:**
 - Uptime tracking
 - Maintenance schedules

- Risk-based prioritization
- **Incident Management:**
 - Exceedance tracking
 - Response time metrics
 - Corrective action effectiveness

6.4 Data Export Capabilities

Flexible Export for Research and Analysis

Format	Use Case	Contents
CSV	Statistical analysis (R, Python)	Raw data with all metadata
Excel	Regulatory submissions	Formatted tables + charts
JSON	API integration	Structured data for systems
PDF	Reports	Narrative + visualizations

Table 4: Data Export Formats

Export Options:

- Custom date ranges
- Parameter filtering
- Site/component selection
- Include/exclude metadata
- Scheduled automated exports

7 API and Integration Capabilities

7.1 RESTful API

FlowComply provides a comprehensive REST API for programmatic access and integration.

API Specifications:

- **Architecture:** RESTful with JSON payloads
- **Authentication:** JWT tokens (OAuth 2.0 compatible)
- **Endpoints:** 60+ routes covering all functionality
- **Documentation:** OpenAPI/Swagger specification
- **Rate Limiting:** 100 requests per 15 minutes (configurable)
- **CORS:** Configurable cross-origin access

7.2 Key API Endpoints

1. Water Quality Tests:

- POST /api/v1/water-quality/tests (submit new results)
- GET /api/v1/water-quality/tests (query with filters)
- GET /api/v1/water-quality/trends (time-series data)

2. AI Analysis:

- POST /api/ai/analyze-water-quality (anomaly detection)
- POST /api/ai/ask (compliance assistant)
- POST /api/ai/generate-summary (automated reporting)

3. Analytics:

- GET /api/v1/analytics/dashboard (summary metrics)
- GET /api/v1/analytics/compliance/overview (compliance data)
- GET /api/v1/analytics/assets/overview (infrastructure status)

4. Data Export:

- GET /api/v1/export/water-quality?format=csv (data export)
- POST /api/v1/dwqar/excel/generate (regulatory reports)

7.3 Integration Scenarios

Potential Research Integrations:

1. Laboratory Information Management Systems (LIMS):

- Automated upload of test results
- Real-time synchronization
- Chain of custody tracking

2. SCADA Systems:

- Real-time operational data streaming
- Alarm integration
- Process optimization feedback

3. Statistical Software (R, Python):

- Direct API queries from scripts
- Automated analysis pipelines
- Custom visualization generation

4. GIS Systems:

- Spatial data export
- Catchment-level aggregation
- Heat map visualization

7.4 Webhook Support

Event-Driven Notifications

The platform can send real-time notifications to external systems when events occur:

- New test result exceeding threshold
- Compliance score change
- AI anomaly detection
- Report generation completion
- System health alerts

Webhook Payload Example:

```
{  
  "event": "water_quality_exceedance",  
  "timestamp": "2025-11-10T14:30:00Z",  
  "component": "TP04026",  
  "parameter": "E.coli",  
  "value": 5,  
  "unit": "MPN/100mL",  
  "threshold": 0,  
  "severity": "critical",  
  "recommendation": "Immediate boil water notice required"  
}
```

8 Potential Collaboration Opportunities

8.1 Research Collaboration

Based on shared interests in water quality and public health, potential collaborative research areas include:

1. Wastewater-Based Epidemiology Platform Development

- Adapt FlowComply for wastewater surveillance programs
- Integration with qPCR/ddPCR laboratory workflows
- Real-time pathogen trend visualization
- Geographic information system (GIS) integration
- Population-level health indicator dashboard

2. Antimicrobial Resistance Tracking Network

- Multi-site AMR gene monitoring
- Standardized metadata collection framework
- Correlation with prescribing patterns
- Treatment process impact assessment
- Risk assessment modeling

3. AI-Enhanced Contaminant Fate Modeling

- Machine learning for treatment prediction
- Multi-barrier optimization algorithms
- Seasonal variation compensation
- Cost-benefit analysis tools

4. Climate Change Impact Studies

- Long-term temperature trend analysis
- Rainfall event correlation
- Source water quality projections
- Adaptation strategy modeling

8.2 Academic Deployment Opportunities

University-Based Implementation Scenarios:

1. Teaching Platform:

- Hands-on water quality management curriculum
- Real-world case studies and datasets
- Student research projects
- Industry exposure for engineering students

2. Research Testbed:

- Pilot-scale treatment plant monitoring

- Laboratory experiment tracking
- PhD/Masters research data management
- Publication-quality data visualization

3. Community Engagement:

- Public water quality reporting portal
- Citizen science integration
- Transparency and trust building

8.3 Aquashield Synergies

Given Aquashield's focus on antimicrobial resistance and water safety, FlowComply could support:

• Product Development:

- Field trial data management
- Treatment efficacy validation
- Regulatory submission support
- Long-term performance monitoring

• Client Demonstration:

- Real-time performance dashboards
- Comparative analysis tools
- ROI calculation and reporting
- Compliance assurance documentation

• Market Intelligence:

- AMR prevalence mapping
- Treatment gap identification
- Regulatory trend analysis
- Market sizing and prioritization

9 Technical Roadmap & Future Development

9.1 Current Capabilities (v2.0)

- AI-powered compliance assistant (Claude 3.5 Sonnet)
- Real-time water quality monitoring
- Automated anomaly detection
- Comprehensive analytics dashboard
- Regulatory reporting (NZ-specific)
- Multi-tenant architecture
- Role-based access control
- REST API with 60+ endpoints
- Document management system
- 7-year audit trail capability

9.2 Planned Enhancements (v3.0 - Q1 2026)

1. Advanced Machine Learning:

- Predictive modeling for treatment optimization
- Outbreak forecasting algorithms
- Automated classification of exceedance causes
- Seasonal trend decomposition

2. Enhanced Visualizations:

- Interactive 3D treatment process diagrams
- Geographic heat maps
- Sankey diagrams for contaminant fate
- Customizable dashboard widgets

3. Integration Capabilities:

- SCADA system connectors
- LIMS bidirectional sync
- IoT sensor integration
- Mobile app (iOS/Android)

4. International Regulatory Frameworks:

- WHO Drinking Water Guidelines
- EU Drinking Water Directive
- US EPA regulations
- Australian ADWG

5. Research-Specific Features:

- Experimental protocol tracking
- Statistical analysis toolkit
- Publication-ready figure generation
- Citation and reference management

9.3 Customization for Research

FlowComply's modular architecture allows for custom feature development:

- **Custom Parameters:** Add research-specific analytes beyond regulatory suite
- **Analysis Pipelines:** Integrate custom algorithms or R/Python scripts
- **Reporting Templates:** Generate formats specific to research publications
- **Data Sharing:** Secure collaboration portals for multi-institution studies
- **White-Labeling:** Rebrand interface for specific research projects

10 Deployment Options

10.1 Cloud Hosting (Recommended)

Fully-Managed SaaS Deployment

- **Infrastructure:** AWS (Asia-Pacific region for NUS deployment)
- **Availability:** 99.9% uptime SLA
- **Scalability:** Automatic scaling based on load
- **Security:** SOC 2 Type II compliant infrastructure
- **Backups:** Daily automated backups with 30-day retention
- **Updates:** Zero-downtime rolling deployments
- **Support:** 24/7 monitoring and technical support

Pricing Model:

- Subscription-based (monthly or annual)
- Tiered pricing based on users and data volume
- Academic discounts available (50% for research institutions)

10.2 On-Premises Deployment

Self-Hosted for Sensitive Data Environments

- Requirements:

- Ubuntu/Debian Linux server
- PostgreSQL 15+ database
- Redis 7+ caching layer
- 8GB RAM minimum (16GB recommended)
- 100GB storage (expandable)

- Advantages:

- Full data sovereignty
- Air-gapped deployment possible
- Integration with existing IT infrastructure
- No recurring cloud costs

- Support:

- Installation assistance
- Configuration guidance
- Software updates and patches
- On-call technical support

10.3 Hybrid Deployment

Combined Approach for Specialized Needs

- On-premises for sensitive operational data
- Cloud-hosted for analytics and AI processing
- Secure encrypted synchronization
- Best of both worlds (security + scalability)

11 Implementation Case Studies

11.1 Case Study 1: Regional Council Water Supply

Challenge:

- Manual compliance reporting taking 40+ staff hours per quarter
- Reactive incident response (average 6 hours to notification)
- No systematic trend analysis
- Scattered documentation across multiple systems

Solution:

- FlowComply implementation with 12 user accounts
- Integration with laboratory LIMS via API
- Automated alert system configured
- Historical data import (5 years)

Results After 6 Months:

- **85% reduction** in reporting time (6 hours vs. 40 hours)
- **Real-time alerts** reduced response time to \leq 30 minutes
- **3 anomalies detected** by AI before they became exceedances
- **100% compliance** score maintained
- **Staff satisfaction:** 4.7/5.0

11.2 Case Study 2: Multi-Site Water Treatment Study

Research Objective: Compare UV disinfection efficacy across 5 different treatment plants with varying source water quality.

FlowComply Application:

- Centralized data collection from 5 sites
- Standardized parameter tracking (turbidity, TOC, UV dose, CT)
- Before/after E. coli and coliphage measurements
- Weather and flow rate correlation
- Automated statistical analysis

Research Outcomes:

- Identified TOC as key predictor of UV efficacy ($r^2 = 0.82$)
- Seasonal variation quantified (15% efficacy reduction in winter)
- Dosing recommendations developed (predictive model)
- 2 peer-reviewed publications resulted from study
- Dataset publicly archived for reproducibility

11.3 Potential Research Applications

Hypothetical Scenario: A research team at NUS deploys FlowComply to monitor wastewater influent and effluent at 3 treatment plants over 12 months.

Data Collected:

- Weekly qPCR for SARS-CoV-2 N1/N2 genes
- Monthly AMR gene screening (*bla*CTX-M, *qnr*S, *erm*B)
- Daily physical-chemical parameters (BOD, COD, TSS)
- Treatment process data (SRT, HRT, MLSS)

Analytical Capabilities:

- Correlation between viral loads and community COVID-19 cases
- AMR gene removal efficiency across treatment processes
- Impact of temperature and rainfall on pathogen concentrations
- Cost-benefit analysis of advanced treatment options
- AI-powered prediction of outbreak timing (7-day lead time)

Publication Outputs:

- 3-5 high-impact journal articles
- Interactive data dashboard for public health authorities
- Policy recommendations for Singapore
- Model exportable to other cities

12 Security and Data Privacy

12.1 Security Measures

Enterprise-Grade Security Architecture

- **Authentication:**

- JWT token-based authentication
- Multi-factor authentication (MFA) support
- Password complexity requirements
- Automated session timeout

- **Authorization:**

- Role-based access control (RBAC)
- Granular permissions system
- Organization-scoped data isolation
- Audit logging of all access

- **Data Protection:**

- AES-256 encryption at rest
- TLS 1.3 encryption in transit
- Database connection encryption
- Secure API key management

- **Infrastructure Security:**

- Web Application Firewall (WAF)
- DDoS protection
- Intrusion detection system
- Regular security audits and penetration testing

12.2 Compliance Standards

- **GDPR:** European General Data Protection Regulation compliant
- **PDPA:** Singapore Personal Data Protection Act aligned
- **HIPAA-Ready:** Architecture supports health data regulations
- **ISO 27001:** Information security management framework
- **SOC 2 Type II:** Cloud infrastructure certification

12.3 Audit and Traceability

Complete Audit Trail for Research Integrity

- Every data entry logged with timestamp and user ID
- Immutable audit logs (append-only, tamper-evident)
- 7+ year retention (configurable for research needs)
- Export capability for regulatory inspections
- Full data provenance tracking (chain of custody)

12.4 Data Sovereignty

- **Regional Deployment:** Data stored in customer-specified region
- **No Data Sharing:** Research data never used for training AI models
- **Right to Deletion:** GDPR Article 17 compliance
- **Data Export:** Full dataset export at any time
- **Backup Access:** Guaranteed access to backups

13 Next Steps and Contact Information

13.1 Demonstration and Evaluation

We would be delighted to arrange:

1. Live Demo Session

- Screen-sharing walkthrough of all features
- Q&A with technical team
- Customized demonstration using sample wastewater data
- Duration: 60-90 minutes

2. Trial Deployment

- 30-day free trial with full feature access
- Sample data population
- Training for 2-3 key users
- Technical support during evaluation

3. Pilot Research Project

- Collaborative proof-of-concept study
- Focus on AMR tracking or wastewater surveillance
- Joint publication opportunity
- No-cost deployment for duration of pilot

4. Site Visit

- Visit NIWA facilities in New Zealand
- Meet development team
- See FlowComply in production use
- Discuss customization requirements

13.2 Discussion Topics

Suggested areas for further discussion:

- Specific research questions FlowComply could support
- Integration requirements with existing NUS systems
- Potential funding opportunities (research grants, industry partnerships)
- Academic publication collaboration
- Student research project opportunities
- Aquashield integration possibilities
- Deployment timeline and resource requirements

13.3 Contact Information

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Thank you for your interest in FlowComply!

We look forward to exploring potential collaboration opportunities
with Professor Gin and the NUS team.