

**COMMUNITY WASTEWATER SYSTEM STANDARDS
LOUDOUN COUNTY SANITATION AUTHORITY
LEESBURG, VIRGINIA**

January 15, 2003

These Community Wastewater System Standards have been authorized by the "Statement of Policy concerning Community Water and Sewer Systems" as adopted by the Loudoun County Sanitation Authority (the Authority) Board of Directors on December 15, 1989. As such, this document provides requirements and standards for wastewater systems designed and constructed on behalf of the Authority. These standards are not intended to be all-inclusive. The Authority will consider alternative means and methods to accomplish its objectives, based upon good engineering practice and demonstrated technical effectiveness, reliability, and cost-effectiveness.

The Community Wastewater System Standards presented herein shall supplement the latest edition of the "Sewage Collection and Treatment Regulations" (SCAT) as published by the Commonwealth of Virginia, Virginia Department of Health (VDH) (12 VAC 5 – 581 – 10 et seq.), *i.e.*, the SCAT Regulations. The SCAT regulations represent the minimum design requirements set forth by the Virginia Department of Health. All aspects of the SCAT regulations shall be adhered to. As the owner, the Authority may identify and determine the need for standards and requirements that are more stringent than those contained in Part III of the Regulations. The headings and sub-headings of this document (beginning with Part I below) follow the general format of the SCAT regulations. In instances where no additional requirements are specified, headings and sub-headings have been retained to maintain format similarity between this document and the SCAT regulations.

If the proposed system uses a soil-based effluent discharge, wastewater infrastructure shall meet the requirements of the latest edition of the "Sewage Handling and Disposal Regulations" as published by the Commonwealth of Virginia, Virginia Department of Health (VDH) (12 VAC 5 – 610 – 10 et seq.).

In addition, wastewater infrastructure shall meet the Authority's Design Standards, latest edition. The Authority will grant no exceptions to the requirements of these Standards.

Approved:

Dale C. Hammes, P.E.
General Manager

PART I - PROCEDURAL REGULATIONS

Article 1 - Definitions and Terms

12 VAC 5-581-10 Definitions

Comply with the SCAT Regulations and the following:

“Applicant” means the developer or property owner seeking approval of the Community Wastewater System.

“Authority” means the Loudoun County Sanitation Authority, Leesburg, Virginia.

“Authority Design Standards” means Authority-approved procedures methods and materials as promulgated in the *Approved Products List – Water and Sewer, Standard Details, Standards and Extensions For Water System and Sewer System*, and all subsequent requirements for the design and construction of LCSA facilities.

“Community Wastewater System” means any freestanding system to be owned and/or operated by the Authority. Freestanding systems are not connected to the Authority’s central wastewater system located in eastern Loudoun County.

“Major Process Equipment” means mechanically or electrically actuated process equipment requiring routine maintenance and specified in Divisions 11 through 16 of contract specifications formatted in accordance with the Construction Specifications Institute. Major process equipment includes pumping and treatment unit processes and associated electrical controllers.

“SCAT Regulations” means the “Sewage Collection and Treatment Regulations” as published by the Commonwealth of Virginia, State Department of Health (VDH) (12 VAC 5-581-10 et seq.), latest edition.

12 VAC 5-581-20 Terms

Comply with the SCAT Regulations.

Article 2 – Procedures

12 VAC 5-581-30 Compliance with the APA

Comply with the SCAT Regulations.

12 VAC 5-581-40 Extent of Regulations

Comply with paragraphs A through D of the SCAT Regulations and the following:

E. The service area of any Community Wastewater System shall be as reviewed by the Authority and approved by the County Board of Supervisors. If, in the future determination of the Authority, the system may be connected to another wastewater system, the Authority may do so at its discretion.

F. The Community Wastewater System shall be approved by the Authority. As owner and operator, the Authority represents the future customers who will depend on a reliable and durable facility. As such, the Authority reserves the right of approval. Before agreeing to accept any Community Wastewater System, the Authority shall review and approve all design documents applicable to that system; including the Basis of Design, Preliminary Engineering Report, and Plans and Specifications. Said review and approval shall be in accordance with these standards and shall be in addition to, and take precedence over, required approvals by county, state, and federal authorities. The Authority's procedure as shown in Exhibit 1 shall govern all review and approvals. This procedure allows the Engineer to apply for a VPDES or VPA permit directly to DEQ, but thereafter requires that the Authority approve a "Basis of Design" prior to the Preliminary Engineering Conference required by the VDH. It also requires approval of a "Preliminary Engineering Report" prior to submitting the official Preliminary Engineering Proposal to VDH. Applications to VDH shall be made with the knowledge and approval of the Authority who, acting as owner and operator, shall become the permit holder.

G. Community Wastewater Systems shall be constructed at no cost to the Authority. To ensure standardization, reasonable equipment inventories, and compatibility with efficient maintenance procedures, the design and construction shall be in accordance with these standards as well as the latest editions of the "Sewage Collection and Treatment Regulations" as published by the Commonwealth of Virginia, Virginia Department of Health (VDH) (12 VAC 5 – 581 – 10 et. seq., i.e., the Regulations); the Biosolids Use Regulations as published by the Commonwealth of Virginia, VDH (12 VAC 5-585); the "Sewage Handling and Disposal Regulations" as published by the Commonwealth of Virginia, VDH (12 VAC 5 – 610 – 10 et seq.); the Authority's "Design Standards"; the Authority's "Sewage Pumping Station Design Standards"; and the Authority's "Approved Products List: Water and Sewer".

H. Each Community Wastewater System shall be financially self-sustaining. As such, operating, maintenance, and repair and replacement costs shall be borne by the owners of all properties within the service area for said system and a notice to this effect shall be recorded in each homeowner's covenant. In the interest of economy-of-scale, a mandatory connection provision may be required by the Authority Board for inclusion within the homeowner's covenant.

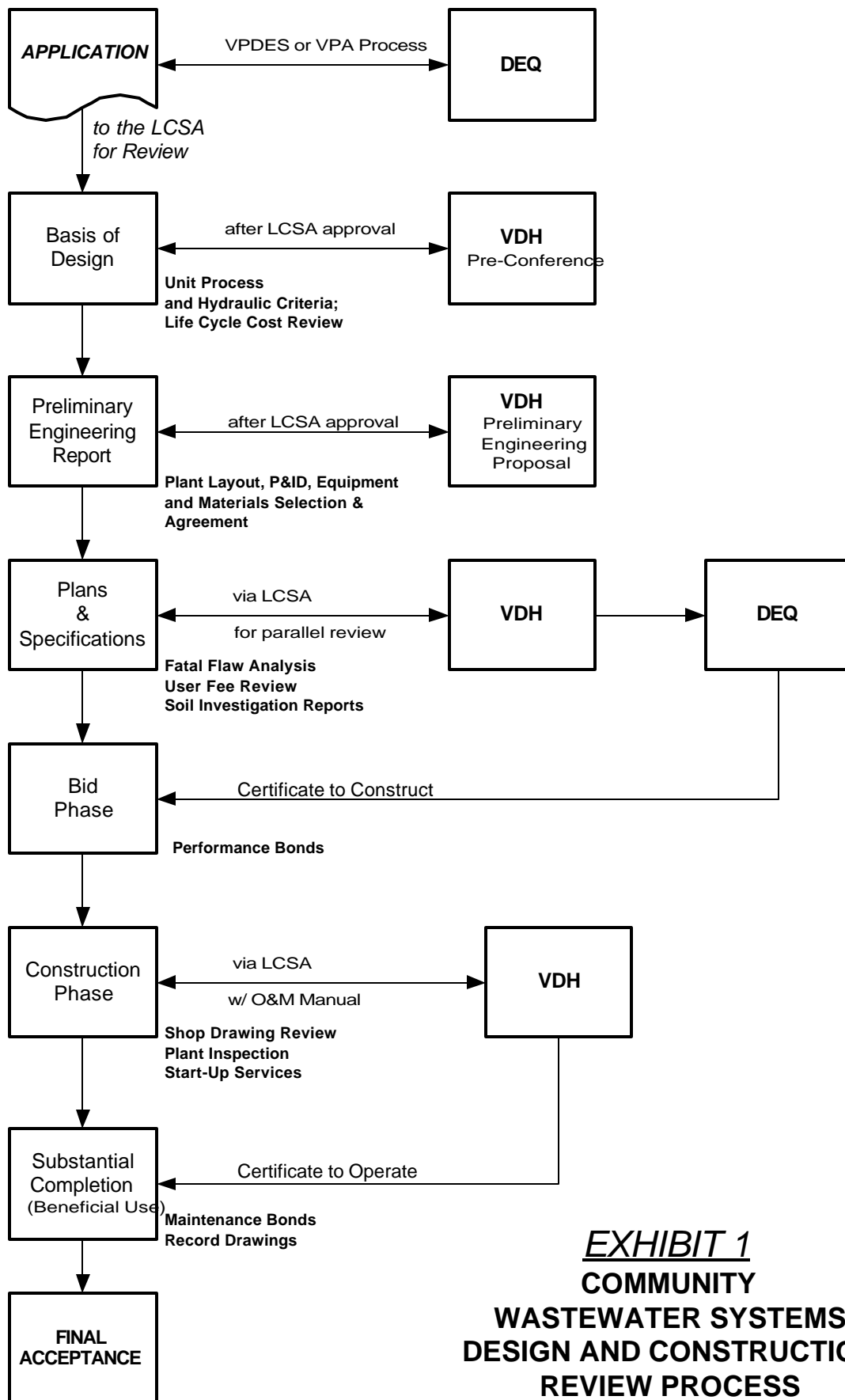


EXHIBIT 1
COMMUNITY
WASTEWATER SYSTEMS
DESIGN AND CONSTRUCTION
REVIEW PROCESS

I. Adequate construction and maintenance easements or access rights-of-way for all Community Wastewater Systems shall be provided. Said easement access shall be provided for planned extensions as well as new infrastructure. Perpetual easements in lieu of fee simple property for pumping stations and treatment facilities may not be provided unless specifically approved by the Authority.

J. Community Wastewater Systems shall require an Agreement (Wastewater Agreement) between the Authority and the Applicant. The Agreement shall provide for the Applicant to subsidize the operation and maintenance of the plant until such time that 90 percent of the units within the development are sold and connected to the system. The Applicant shall agree to perform all construction in accordance with plans and specifications approved by the Authority and in accordance with Authority standards. Applicant shall agree to transfer to the Authority all property and facilities free of debts, liens and/or other legal encumbrances, for ownership, operation and maintenance. The Agreement shall be completed prior to acceptance of Plans and Specifications by the Authority. A model Agreement is presented in the Attachment. The Authority shall develop all Agreements.

K. A "User Fee Review", consisting of a rate study, shall be provided to the Authority for review no later than the final submission of the plans and specifications. The user fee review shall determine annual costs for a five-year basis, replacement costs for 40 years, and develop a recommended fee structure for the community system based on a basic fee for administrative costs and a metered rate per 1,000 gallons of use.

12 VAC 5-581-50 Enforcement

Comply with the SCAT Regulations.

12 VAC 5-581-60 Emergency Orders

Comply with the SCAT Regulations.

12 VAC 5-581-70 Variances

Comply with paragraphs A through E of the SCAT regulations and the following:

F. The Applicant may apply to LCSA for variances to these Community Wastewater Standards provided the variance requests are brought to the attention of the Authority prior to the approval of the Preliminary Engineering Report.

12 VAC 5-581-80 Types of Hearings

Comply with the SCAT Regulations.

12 VAC 5-581-90 Informal Conference

Comply with the SCAT Regulations.

12 VAC 5-581-100 Hearing

Comply with the SCAT Regulations.

12 VAC 5-581-110 Permits

Comply with paragraphs A and B of the SCAT Regulations and the following:

C. The Applicant shall provide a certificate from the Loudoun County Zoning Administrator that the area to be served by the proposed treatment facility has been officially zoned for the particular type, or types, of land use described in the application. A copy of the Site Plan Permit is also required of the applicant.

12 VAC 5-581-120 Reliability Classification

Comply with paragraphs A through C of the SCAT Regulations and the following:

D. Community Wastewater Systems shall be classified as Reliability Class I.

12 VAC 5-581-130 Permit Procedures

Comply with the SCAT Regulations.

12 VAC 5-581-140 Application

Comply with the SCAT Regulations and the following:

Provide a "Basis of Design" report that shall include:

- A. Proposed Service Area
 - 1. Detailed vicinity map showing individual lots within the proposed community's layout.
 - 2. Required system capacity based on number of proposed lots and Authority-required flow rates.
- B. Discharge/Land Application Determination
 - 1. Description of discharge location
 - 2. Required permit
 - 3. Required treatment limits
- C. Treatment Technology
 - 1. Describe applicable (and Authority acceptable) treatment technologies and provide a process flow diagram for each.

2. Perform, if necessary, life cycle cost comparisons among competing technologies considering initial and replacement costs, maintenance costs, operational costs and reliability.

3. For selected treatment technology, provide design criteria, catalog cutsheets of major process equipment, and a detailed process flow diagram showing number of units and capacities of the major equipment components. Design criteria must meet the more stringent of VDH SCAT Regulations or LCSA standards.

D. Land Application of Treated Effluent

1. Spray application - preliminary phase site evaluation (per SCAT regulations). The Authority promotes spray application for reuse purposes. However, if spray application is proposed for disposal purposes only, this method of disposal is discouraged; and the Applicant must request a variance from the Authority during the Basis of Design. The Authority will only consider spray irrigation for effluent disposal if the Applicant can show that subsurface disposal is not possible on the Applicant's property.

2. Subsurface disposal - provide same applicable information as for spray application.

E. Other Requirements:

1. Sludge Management Plan (Authority will provide upon request)

2. Facility location

3. Architectural issues

12 VAC 5-581-150 Preliminary Engineering Conference

Comply with the SCAT Regulations.

The Applicant will coordinate the meeting with VDH and the Authority after approval of the Basis of Design.

12 VAC 5-581-160 Preliminary Engineering Proposal

Comply with the SCAT Regulations.

The Applicant will coordinate the meeting with VDH and the Authority after approval of the Preliminary Engineering Report.

B. Content – include the following:

xvii Process and instrumentation diagram

xviii Equipment selection

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- xix Materials of construction
 - xx Soil investigation reports
 - xxi Community Wastewater System Agreement modification requests

12 VAC 5-581-170 Plans

Comply with the SCAT Regulations.

The Applicant will initially submit the plans to the Authority for review. The Applicant may send subsequent submissions to the Authority and VDH for parallel review.

12 VAC 5-581-180 Specifications

Comply with the SCAT Regulations and include a User Fee proposal.

The Applicant will initially submit specifications to the Authority for review. The Applicant may send subsequent submissions to the Authority and VDH for parallel review.

12 VAC 5-581-190 Operation and Maintenance Manual

Comply with paragraphs A and B of the SCAT Regulations and the following:

C. Draft and Final “Operating and Maintenance Manuals” must be approved by the Authority prior to submittal to the VDH for approval.

D. At the option of the Authority, the applicant shall provide a lump sum payment to the Authority equal to three percent of the construction costs of major process equipment in lieu of manufacturer-recommended spare parts. Under this option the Authority will order and store spare parts.

E. Specifications for major process equipment shall include provisions for training of LCSA personnel in operation and maintenance of the equipment. Minimum training provided shall include 3 separate days of on-site instruction to allow attendance by different shifts of LCSA personnel. Instructors shall be certified by the equipment manufacturers as competent to provide the required training.

12 VAC 5-581-200 Sludge Management Plans

Comply with paragraphs A and B of the SCAT Regulations and the following:

D. A Sludge Management Plan is available from the Authority.

12 VAC 5-581-210 Formal Requirements for Submission of Engineering Data

Comply with the SCAT Regulations and the following:

A. Surveying shall meet State grid coordinate specifications. Provide four northern Virginia grid coordinates for plan views and two horizontal and vertical control

benchmarks per site. All drawings shall be 24 x 36-inches in size. Pipeline profiles shall have a horizontal scale of 1" = 50' or less.

B. Geotechnical evaluation, including adequate borings, shall be provided as part of the formal submission of plans and specifications.

C. VDH written approval of active and reserve drainfield sites shall be required. All soils investigation reports completed for the applicant shall be provided to the Authority during the Preliminary Engineering Report phase.

D. Calculations shall be submitted for review, and will include hydraulics, process kinetics, anti-flotation calculations, generator sizing, and water hammer analyses. Water hammer analyses may be waived by the Authority for pump station capacities less than 500 gallons per minute, or station pressures less than 50-feet total dynamic head. Systems where column separation can occur shall have water hammer analyses conducted.

E. A clean water testing and start-up plan shall be provided for review and approval by the Authority.

F. Before the Authority will review the Applicant's plans and specifications, the Applicant must pay applicable engineering review fees as described in the Community Wastewater System Agreement.

12 VAC 5-581-220 Processing of Plans, Specifications and Other Engineering Documents

Comply with the SCAT Regulations and the following:

See Exhibit 1 for a flow diagram of the Authority's design review process.

12 VAC 5-581-230 Construction Permit

Comply with paragraphs A through C of the SCAT Regulations and the following:

A. Issuance – The Authority must review and approve the construction drawings, plans and specifications for a project pursuant to construction permit issuance and will submit the same to Virginia Department of Health for a Certificate to Construct. The construction permit references the executed Community Water/Wastewater System Agreement between LCSA and the owner/developer and summarizes the terms and conditions between the parties. Complete execution of this agreement is required before the project receives approval by the Authority's Engineer. Virginia Department of Health requires a construction permit to be issued and executed by an engineer certified in the State of Virginia as a Professional Engineer.

Upon approval, the Authority will send notice and a construction permit for execution. Acceptable performance/labor and materials payment bond in the amount estimated for the installation of these utilities, as agreed by the developer's consulting engineers;

certificate of insurance; payment of inspection fees; submission/approval of associated easement/record plats must be in place prior to issuance of construction permit. Once all necessary items are in place, the Authority will fully execute the permit and send approved plans and permit to Inspections Department for pre-construction meeting. The Applicant shall submit its proposed agenda to the Authority for approval at least seven days prior to the conference. The Applicant shall also submit a proposed list of major process equipment shop drawings to be reviewed by the Authority.

The Authority will accept or reject shop drawings for major process equipment and provide inspection of the Community Wastewater Systems in accordance with the Community Wastewater System Agreement. All shop drawing submittals shall bear the stamp of approval of the Applicant as evidence that the Applicant has checked the shop drawings. Submittals without this stamp of approval will not be reviewed and will be returned to the Applicant for resubmission. The Applicant shall cite in the letter of transmittal all shop drawing variances from the requirements of the Contract Documents and the design modifications proposed to accommodate the variances. If variances are not cited, the Applicant will not be relieved of the responsibility for executing the work in full conformance with the Contract Documents even though such submittals have been accepted by the Authority.

Pumps and other major process equipment shall be certified by the manufacturer. Certifications shall be provided to the Authority prior to shipping to the site.

C. Completion of Construction – add:

4. The Applicant shall complete and submit the “Statement of Completion of Construction” to VDH upon the Authority’s satisfaction that the Treatment Works meets the requirements of the approved plans and specifications and only when a final inspection by the VDH is warranted. LCSA shall approve the “Statement of Completion of Construction” prior to the Applicant submitting it to VDH.

5. The Applicant shall maintain record drawings of as-built conditions that vary from the work as originally shown on the contract drawings. The Applicant shall submit AutoCAD electronic files of the record drawings to the Authority prior to acceptance of the facility by the Authority. Provide coordinates in accordance with the Virginia State Plane Coordinate System (NAD 83) for field location of valves, manholes and other buried facilities as directed by LCSA.

12 VAC 5-581-240 Operation Permit

Comply with the SCAT Regulations.

12 VAC 5-581-250 Permit Modifications or Revocation Actions

Comply with the SCAT Regulations.

12 VAC 5-581-260 *Non-conventional Methods, Processes or Equipment*

Comply with paragraphs A through F of the SCAT Regulations and the following:

G. Land application processes shall be based on proven, conventional technology. Land application processes not specifically defined within the Regulations shall be treated by the Authority and the VDH as non-conventional and subject to the Commonwealth's Provisional Operation Permit for a period of 18-months. The Authority shall first review any request for non-conventional methods prior to the Applicant's submission to VDH. The applicant must provide pilot data and operational experience in similar situations and conditions demonstrating that the non-conventional system will operate as designed. An operating and maintenance bond for non-conventional systems, equal to 50% of the construction cost of the treatment facilities, will be provided to the Authority for an operating period of five years.

H. Filtration and disinfection units shall be required for non-conventional land application systems, except that post aeration, chlorine contact tanks and dechlorination shall not be necessary. Gas facilities for chlorination and dechlorination shall not be utilized.

12 VAC 5-581-270 *Non-discharging Treatment Works*

Comply with the SCAT Regulations and the following.

A. If the applicant intends to construct a non-discharging treatment works, a soil profile report must be submitted to the Authority which includes soil classifications and depth to bedrock, utilizing one boring per 1,000 square feet of absorption field.

12 VAC 5-581-280 *General Permit for Sewerage Systems*

Comply with the SCAT Regulations.

12 VAC 5-581-290 *Compliance with Part II (Operational Regulations)*

Comply with the SCAT Regulations.

12 VAC 5-581-300 *Compliance with Part III (Manual of Practice)*

Comply with the SCAT Regulations.

12 VAC 5-581-310 *Sewerage Collection and Treatment Advisory Committee*

Comply with the SCAT Regulations.

PART II - OPERATIONAL REGULATIONS

Article 1 – Monitoring

12 VAC 5-581-320 Influent and Effluent Monitoring

Comply with the SCAT Regulations.

12 VAC 5-581-330 Operational Testing and Control

Comply with the SCAT Regulations.

12 VAC 5-581-340 Land Based System Monitoring

Comply with the SCAT Regulations.

Article 2 - Operation and Maintenance Manuals

12 VAC 5-581-350 Manuals

Comply with paragraphs A and B of the SCAT Regulations and the following :

C. Draft and Final “Operating and Maintenance Manuals” must be approved by the Authority prior to substantial completion before submittal to VDH for approval.

Article 3 - Sewerage Systems and Treatment Works Reliability

12 VAC 5-581-360 Reliability

Comply with paragraphs A through D of the SCAT Regulations and the following:

A. Operability – add:

1. For treatment facilities larger than 40,000 gpd, dual process units shall be required.

PART III - MANUAL OF PRACTICE FOR SEWERAGE SYSTEMS AND TREATMENT WORKS

Article I - Collection and Conveyance Sewers

12 VAC 5-581-370 Design Factors

Comply with paragraphs A through C of the SCAT Regulations and the following:

B. Factors – add:

ix. Average daily design flow and peaking factors shall comply with the Authority’s “Sewer System – Standards and Extensions”.

12 VAC 5-581-380 Design Details

Comply with the SCAT Regulations.

12 VAC 5-581-390 Construction Details

Comply with the SCAT Regulations.

12 VAC 5-581-400 Vacuum Sewerage System

Comply with paragraphs A through E of the SCAT Regulations and the following:

F. Vacuum sewer systems will not be allowed.

12 VAC 5-581-410 Manholes

Comply with the SCAT Regulations.

12 VAC 5-581-420 Water Quality and Public Health Protection

Comply with the SCAT Regulations.

12 VAC 5-581-430 System Access

Comply with the SCAT Regulations.

Article 2 - Sewage Pump Stations

12 VAC 5-581-440 Sewage Pumping

Comply with the Authority’s “Sewage Pumping Station Design Standards”, paragraphs A through E of the SCAT Regulations, and the following:

A. Features – add:

13. Provide manual bar screens only for emergency bypass applications.
14. For treatment plants that do not have equalization basins, influent sewage pumping stations shall have three pumps of equal capacity, with two pumps in parallel being capable of delivering maximum design flow.
15. Treatment works pump stations shall utilize grinder type pumps, Flygt Corporation, or equal.
16. Pump rail guides for submersible applications shall be continuous stainless steel with no couplings.
17. Provide running time meters and external disconnect switches for all pumps.
18. Corrosion protection shall be evaluated, and shall be provided if deemed appropriate by the Authority.
19. Odor control provisions shall be evaluated, and shall be provided if deemed appropriate by the Authority.
20. Fencing shall be black, PVC-coated (ASTM F668 Class 2b) chain link (8 feet fabric height) with 3 barbed wire strands on top and no top rail. Gateposts shall be 4 inches in diameter and corner posts shall be 2.625 inches in diameter. Provide pad lock per LCSA standard with a shank size of 1/4 inch in diameter.

12 VAC 5-581-450 Reliability

Comply with the SCAT Regulations.

12 VAC 5-581-460 Pumping Equipment

Comply with the SCAT Regulations.

12 VAC 5-581-470 Portable Equipment and Diversions

Comply with the SCAT Regulations.

12 VAC 5-581-480 Alarm Systems

Comply with paragraphs A through C of the SCAT Regulations and the following.

B. Class I – add:

Class II and III reliability systems will not be allowed. All community wastewater treatment facilities shall be Class I reliability.

12 VAC 5-581-490 Alternatives

Comply with paragraphs A through C of the SCAT Regulations and the following:

- D. Pneumatic Ejectors – add:
- v. Use of pneumatic ejectors is prohibited.

12 VAC 5-581-500 Force Mains

Comply with paragraphs A through D of the SCAT Regulations and the following:

- C. Materials – add:
- 3. Force main materials of construction shall comply with Table 1 herein and the Authority’s Design Standards”.

Article 3 - Sewage Treatment Works

12 VAC 5-581-510 Treatment Works Design

Comply with the SCAT Regulations.

12 VAC 5-581-520 Standards

Comply with the SCAT Regulations.

12 VAC 5-581-530 Treatment Works Details

Comply with paragraphs A through F of the SCAT Regulations and the following:

- B. Instrumentation – add:
- 1. All influent and effluent flow meters shall be provided with indicating, totalizing and digital recording equipment.
- E. Essential Facilities – add:
- 5. The Authority owns and operates a regional laboratory and as such, the minimum laboratory space of 400 square feet shall not be required unless specifically required by the Authority in the “Basis of Design”. Note that sufficient work space must still be provided for daily operations tests.
- F. Odor Control – add:
- 1. Odor control provisions shall be required.
- G. Treatment facilities shall provide the following Authority standard equipment:
- Safety equipment.

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- Laboratory equipment and supplies.
 - Confined entry equipment.
 - Flow indicator, totalizer and digital recorder for plant influent and effluent flow monitoring.
 - Doors with closers and wall mounted hook doorstops. Keys shall be matched using the LCSA standard.
 - Potable water system for wash down facilities, lavatory, and laboratory.
 - Wash down facilities for each major unit process. Major unit processes will be identified as such by LCSA during the review of the “Basis of Design”. Each major unit process shall have a hose bib with 50 feet of 1-inch diameter hose capable of producing at least 20 gpm at 60 psi.
 - Lavatory (toilet, sink, and shower) with a 30-gallon hot water heater.
 - Heating and air conditioning in the laboratory and sodium hypochlorite storage rooms.
 - Facility address sign at facility entrance in accordance with Authority standard detail.
 - Emergency showers and eyewashes per OSHA requirements.
 - Gas monitors per OSHA and LCSA requirements.

H. Subsurface wastewater disposal facilities shall provide biological nutrient removal (BNR) for total nitrogen. These facilities shall utilize suspended growth activated sludge processes as the primary biological treatment process. All treatment processes must be approved by the Authority during the “Basis of Design” step.

I. Systems utilizing drainfield applications shall be provided with adequate provisions to protect the fields from heavy equipment and recreational usage detrimental to the drainfield soils and piping. Drainfield piping materials and construction shall be designed for AASHTO H20 wheel loading.

J. Treatment plant sites shall have bituminous concrete roadways and parking areas equal to 3-inch intermediate (IM1-A) on 6-inches of 21A bedding. A minimum of three parking spaces shall be provided. A turnaround area shall be provided for delivery trucks and all roadways shall be designed for easy access by septic haulers who may be contracted to haul sewage sludge. Roadways to treatment and pumping facilities shall be gated. The gates shall have reflectors. In cases where the treatment plant and/or pumping facility are fenced then the gate shall be a fenced gate with pad lock per LCSA standard with a shank size of 1/4 inch in diameter. Where the treatment plant and/or pumping facility is not fenced, the gate shall be constructed in accordance with the Authority’s standard detail.

K. Provide a minimum of three-foot clearance around all equipment.

L. In cases where future additional unit processes may be required in the opinion of the Authority, adequate physical space and hydraulic grade line shall be provided.

M. Buried steel tanks shall not be allowed without the specific approval of the Authority. In all such cases, cathodic protection and monitoring systems shall be provided.

N. Painting systems for steel tankage shall be as follows:

Exposure	Surface Preparation	Prime Coat	Dry Film Thickness (mils)	Intermediate Coat	Dry Film Thickness (mils)	Finish Coat	Dry Film Thickness (mils)	Total Dry Film Thickness (mils)
Exterior Exposed	SSSP-SP10	Epoxy	2.5-3.5	Epoxy	2.0-3.0	Polyurethane	2.0-5.0	6.5-11.5
Immersion	SSSP-SP10	Zinc-rich epoxy	2.5-3.5	Coal tar epoxy	4.0-6.0	Epoxy	4.0-6.0	10.5-15.5

O. Architecture: Provide suitable architectural treatment. Brick/block shall be provided. Provide quality interior block paint. Split-faced CMU with foam insulation may also be used. Roofs must be sloped and have aluminum gutters with leafguards and downspouts. Use standing seam roof for high visibility areas. Soffit and fascia shall be of low maintenance vinyl or aluminum materials. Provide moisture-resistant painted drywall finish on interior walls; insulate drywall in office and laboratory areas in accordance with Loudoun County code for residential occupancy.

P. Floor slabs within all buildings shall be steel reinforced and shall be 6-inches above finished grade and sloped 1/8-inch per foot to a floor drain. Provide industrial grade vinyl tile, or equal, for office and laboratory areas. Floor drains shall be provided in laboratory and lavatory.

Q. Provide standard Authority building inventory to include suitable shelving, desk and chair for operators, as well as file cabinet for on-site record storage.

R. Chemical Application

1. Chemical systems utilizing sodium hypochlorite shall utilize 15% solutions per AWWA B300 standard.

2. Chemical feed systems shall use liquid solutions or, if approved by the Authority, liquid solutions prepared from dry chemicals. A spare chemical feed pump shall be provided for each system. Adequate facility room and climate control shall be provided for bulk chemical storage and solution day tanks, as the Authority deems necessary. Do not locate process or chemical feed equipment in laboratory or office areas.

3. The applicant shall provide secondary containment for day solution tanks and raw chemical drums, adequate raw chemical transfer equipment, and calibration tubes for all chemical feeders; size chemical feeders to operate near middle of capacity range; and provide separate chemical storage room and ventilation for highly corrosive chemicals. Limit weight of drum lift into secondary containment to 50 pounds.

4. Chemical feed systems shall have the following:

- Peristaltic type feed pumps with antisiphon valve
- Translucent solution tank with liquid level scale
- Vacuum breaker on makeup water spigot when hoses are used
- Temperature control for hypochlorite storage
- Protective equipment (rubber apron, rubber gloves, combination face shield/head gear, safety shower and eyewash station)

S. Electrical equipment shall meet the following Authority standards:

1. Breakers shall be Square D or Cutler-Hammer.
2. Provide automatic reset and startup for all electrical relays.
3. Provide electrical receptacles on all walls, a maximum of twelve feet apart.
4. Exterior control panels shall be stainless steel NEMA 4X. Interior control panels shall be fiberglass NEMA 4X.
5. Equipment and electrical panels shall not be mounted on tanks or wet wells.
6. Provide lights over all exterior doors.
7. Provide GFI protected electrical outlets on front and back of each building.
8. Provided GFI protected electrical outlets every 30 (horizontal) feet in each building.
9. Provide exterior lights around all major process equipment and controls with illuminance ranging from 10 to 20 foot-candles.

T. Miscellaneous standards are as follows:

1. Pipe through floors and wall shall have sleeves with link-seal or equivalent.

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2. Air control valves shall be stainless steel ball valves.
 3. Below grade and submerged reinforced and pre-cast concrete shall have bituminous coating.
 4. Minimum steel thickness shall be ¼- inch plate.
 5. Parshall flume ultrasonic flow meters shall be American Sigma Model 980.
 6. Provide insect screens for all intake louvers.
 7. Valve stems, wheel and chains shall be readily accessible.
 8. Provide sufficient diesel fuel storage to allow all generation equipment to operate 36-hours at full load.

R. Provide piping materials as specified in Table 1.

12 VAC 5-581-540 Treatment Works Outfalls

Comply with paragraphs A through C of the SCAT Regulations and the following:

D. Accessibility – Provide parallel access road 12 feet wide along outfall easement.

12 VAC 5-581-550 Reliability Protection

Comply with the SCAT Regulations.

Article 4 - Preliminary Process

12 VAC 5-581-560 Screening

Comply with the SCAT Regulations.

12 VAC 5-581-570 Grit Removal Facilities

Comply with the SCAT Regulations.

12 VAC 5-581-580 Pre-aeration

Comply with the SCAT Regulations.

12 VAC 5-581-590 Clarifiers

Comply with the SCAT Regulations.

TABLE 1 Piping Materials		
<i>Application</i>	<i>Size</i>	<i>Specification</i>
Force Mains	4-inches & larger	Ductile Iron Pipe AWWA C151, Class 52 minimum, or PVC, AWWA C-900, DR18, w/AWWA C110 or C153 MJ fittings.
Aeration	2-inches & larger	Galvanized Steel Pipe ASTM A53, Schedule 40.
Process Piping above grade	3-inches & larger	Ductile Iron Pipe AWWA C151 w/ AWWA C110 flanged fittings
	2-inches & smaller	PVC, ASTM D2241 Schedule 40 w/ sch. 80 fittings
Process Piping below grade	3-inches & larger	Ductile Iron Pipe AWWA C151, Class 52 minimum w/ AWWA C110 or C153 MJ Fittings
	2 ½ inches & smaller	PVC ASTM D2241, SDR 13.5*
Water Service	¾ inch & larger	Copper, Type L ASTM B88
Sewer Laterals & Sanitary Sewers	4-inches & larger	PVC AWWA C-900, DR 25
Low Pressure Sewers and Drainfield Manifold	3-inches & larger	PVC ASTM D2241, SDR 17*
Downstream of Check valves	2 ½ inches & smaller	PVC ASTM D2241, SDR 13.5*
Drainfield Laterals	3-inches & smaller	Polyethylene tubing AWWA C901
	4-inches & larger	Polyethylene AWWA C906
		* Use VDOT No. 8 stone in lieu of LCSA Standard

Article 5 - Sludge Processing and Management

12 VAC 5-581-600 Sludge Stabilization

Comply with the SCAT Regulations.

12 VAC 5-581-610 Anaerobic Sludge Digestion

Comply with the SCAT Regulations.

12 VAC 5-581-620 Aerobic Sludge Digestion

Comply with paragraphs A and B of the SCAT Regulations and the following:

- C. Sludge holding for a period of 30 days shall be required; thickening to accomplish this holding volume may be provided.
- D. Aerobic digesters shall not utilize mechanical aeration.
- E. Supernatant piping in aerobic digesters will not be required. Provide three one-half HP supernatant sump pumps with 20 feet of 1 ¼ inch diameter corrugated hose.

12 VAC 5-581-630 Composting

Comply with the SCAT Regulations.

12 VAC 5-581-640 Heat Treatment

Comply with the SCAT Regulations.

12 VAC 5-581-650 Chemical Treatment

Comply with the SCAT Regulations.

12 VAC 5-581-660 Sludge Thickening

Comply with the SCAT Regulations.

12 VAC 5-581-670 Sludge Dewatering

Comply with the SCAT Regulations.

12 VAC 5-581-680 Sludge Drying Beds

Comply with the SCAT Regulations.

12 VAC 5-581-690 Filtration

Comply with the SCAT Regulations.

12 VAC 5-581-700 Centrifuges

Comply with the SCAT Regulations.

12 VAC 5-581-710 Sludge Pumping

Comply with the SCAT Regulations.

12 VAC 5-581-720 Sludge Management

Comply with the SCAT Regulations.

Article 6 - Biological Treatment

12 VAC 5-581-730 Attached Growth Processes

Comply with the SCAT Regulations and the following:

Attached growth processes are prohibited except for deep bed denitrification filters or specifically approved by the Authority.

12 VAC 5-581-740 Rotating Biological Contactors

Comply with the SCAT Regulations and the following:

Rotating Biological Contactors are prohibited.

12 VAC 5-581-750 Suspended Growth (Activated Sludge) Process

Comply with paragraphs A through F of the SCAT Regulations and the following:

A. Design – add:

4. Subsurface disposal wastewater treatment facilities shall be designed for a year-round Total Nitrogen effluent concentration of 7.0 mg/l as N and should utilize either an SBR with a tertiary filter or another Authority-approved process. Process kinetics for all biological treatment processes shall be designed using a minimum wastewater temperature of 12-degrees centigrade. Diffused aeration shall be utilized for all suspended growth activated sludge processes (25-degrees centigrade shall be used for the maximum wastewater temperature when calculating maximum diffused air requirements). For systems using return activated sludge (RAS) piping, such piping from airlift geyser pumps shall be hard-piped to discharge into a calibrated weir box for flow measurement at the aeration basin. Common blowers shall not be used for aeration and sludge holding tanks; provide separate blowers or the ability to isolate blowers and maintain adequate airflow to the biological reactors. Blower speed shall not exceed 1800 rpm. Blowers shall be low decibel models with inlet filters, residential-type inlet and outlet silencers and shall be housed in a separate sound-insulated room within the treatment plant enclosure. If the treatment plant

is not enclosed, provide sound insulated housings made by West Chester Manufacturing of Avondale, Pennsylvania or approved equal. Alkalinity addition shall be provided using magnesium hydroxide to maintain a minimum secondary effluent alkalinity of at least 50 mg/l (CaCO₃). Alkalinity shall be fed using multiple feed points in the aeration basins. Lime shall not be used for alkalinity addition. All package plant systems shall minimally have 5 installations treating 100 percent domestic wastewater of similar design size of the proposed system. One of these installations must be operating in Virginia for at least 3 years from the date of initiating the Basis of Design Report. Provide references for all regional and Virginia installations. Provide operating data as requested by the Authority.

12 VAC 5-581-760 Oxidation Ditches

Comply with the SCAT Regulations.

12 VAC 5-581-770 Sequencing Batch Reactors (SBR)

Comply with the SCAT Regulations and the following:

Provide retrievable diffuser assemblies. Each diffuser assembly shall be retrievable (at least 4 feet above the high water level) with an electric winch.

12 VAC 5-581-780 Sewage Stabilization Ponds and Aerated Lagoons

Comply with the SCAT Regulations.

12 VAC 5-581-790 Aerated Lagoons

Comply with the SCAT Regulations.

Article 7 – Effluent Polishing Ponds and Disinfection Processes

12 VAC 5-581-800 Disinfection

Comply with the SCAT Regulations.

12 VAC 5-581-810 Chlorination

Comply with paragraphs A through G of the SCAT Regulations and the following:

A. Chemical – add:

6. Use of gaseous chlorine is prohibited.

B. Design – add:

5. Subsurface wastewater disposal systems and wastewater disposal systems incorporating holding ponds shall use calcium hypochlorite.

12 VAC 5-581-820 Bromochlorination

Comply with the SCAT Regulations.

12 VAC 5-581-830 Ultraviolet Light Irradiation (UV)

Comply with paragraphs A through G of the SCAT Regulations and the following:

H. Surface discharge treatment facilities utilizing filtration shall utilize UV disinfection.

12 VAC 5-581-840 Ozonation

Comply with the SCAT Regulations.

12 VAC 5-581-850 Other Disinfection Methods

Comply with the SCAT Regulations.

12 VAC 5-581-860 Dechlorination

Comply with the SCAT Regulations.

12 VAC 5-581-870 Polishing Ponds

Comply with the SCAT Regulations.

12 VAC 5-581-880 Postaeration

Comply with paragraphs A through C of the SCAT Regulations and the following:

C. Cascade Type – add:

6. Cascade type aerators shall be concrete steps.

Article 8 - Advanced Treatment

12 VAC 5-581-890 Flow Equalization

Comply with paragraphs A and B of the SCAT Regulations and the following:

A. Usage – add:

3. Provide a separate in-line equalization basin, minimum 8-hour HRT based upon design average daily flow, for all wastewater treatment facilities.

12 VAC 5-581-900 Chemical Treatment

Comply with the SCAT Regulations.

12 VAC 5-581-910 Chemical Clarification

Comply with the SCAT Regulations.

12 VAC 5-581-920 Filtration

Comply with paragraphs A through L of the SCAT Regulations and the following:

A. General Design – add:

Tertiary filtration is required by VDH when effluent TSS permit limits are less than or equal to 15 mg/l TSS.

Article 9 - Natural Treatment

12 VAC 5-581-930 Conventional Alternatives

Comply with the SCAT Regulations.

12 VAC 5-581-940 Land Treatment

Comply with paragraphs A through K of the SCAT Regulations and the following:

D. Land treatment methods – add:

4. Land application systems shall be low intensity spray application of disinfected tertiary treated effluent or disposal by a low pressure distribution mass drainfield system or drip system utilizing BNR pretreatment to protect the groundwater. Buffer zones shall at a minimum meet state regulations but will not be less than 100 feet from the edges of eased spray area and shall be increased if there are environmental or community considerations.

H. Field area design – add:

8. Not less than three monitoring wells (one up-gradient and two down-gradient) shall be constructed for land application systems at least one year prior to completion of construction of the treatment facility. Background ground water quality monitoring shall be conducted quarterly for at least one year. Provide official laboratory results to LCSA within 60 days after sampling.

I. Low intensity design – add:

7. The Authority is considering establishing specific minimum design criteria for spray application area design. Before any Applicant begins design of a spray field, the Authority should be contacted, asking whether the criteria have been established.

8. Unless specifically waived by the Authority, the Applicant must complete a wind study for the proposed application sites. The study must determine typical

wind speeds and directions. This information must be taken into consideration during design of the system so as to prevent off-site migration of aerosols while assuring all effluent can be irrigated in a given year.

9. Low intensity spray systems shall include automatic operational controls that cease spray operations if sustained windspeed or precipitation exceed certain programmable levels.

12 VAC 5-581-950 *Constructed Wetlands*

Comply with the SCAT Regulations.

Article 10 - Nutrient Control

12 VAC 5-581-960 *Nutrient Reduction*

Comply with paragraphs A through E of the SCAT Regulations and the following:

E. Attached Growth Systems:

Attached growth systems are prohibited except for deep bed denitrification filters.

12 VAC 5-581-970 *Biological Nitrification*

Comply with the SCAT Regulations and the following:

C. Fixed Film Design

Fixed film systems are prohibited.

12 VAC 5-581-980 *Ammonia Stripping*

Comply with the SCAT Regulations.

12 VAC 5-581-990 *Ion Exchange*

Comply with the SCAT Regulations.

ATTACHMENT

Model Community Wastewater Agreement