

ROUTINE HYDRAULIC CLEANING PROGRAM

FOR



***Winchester Municipal
Utilities***

Winchester, Kentucky

APRIL 2008

Winchester Municipal Utilities (WMU)

Routine Hydraulic Cleaning Program

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Executive Summary

Winchester Municipal Utilities (WMU) finalized its Consent Decree with the Environmental Protection Agency (EPA) in April 2007 for violations of the Clean Water Act that included 27 documented recurring sanitary sewer overflow (SSO) locations. The purpose of the Routine Hydraulic Cleaning Program is to establish needs determination, priorities and scheduling, number of crews and personnel, hydraulic equipment to be used, standard hydraulic cleaning maintenance procedures, standard forms, records and performance measures and an information management system for preventative maintenance of the WMU sanitary sewer collection system.

Implementation of the Routine Hydraulic Cleaning Program will enhance WMU's ability to maintain regulatory compliance and reduce the potential for nonrecurring SSOs in the WMU sanitary sewer collection system. The Routine Hydraulic Cleaning Program will enable WMU to reduce system blockages and maintain the original hydraulic capacity of the sanitary sewer collection system. Additionally, the program will allow WMU to identify areas that require additional maintenance, rehabilitation and/or replacement.

WMU personnel responsible for performance of the Routine Hydraulic Cleaning Program will be trained to follow the procedures as outlined in the program.

The Routine Hydraulic Cleaning Program will be reviewed annually by WMU management to ensure that all elements of the program are up-to-date and are being implemented.

In conclusion, WMU is committed to efficiently maintaining and operating its sanitary sewer system to reduce the negative impact of SSOs and system blockages and to conform with requirements set forth in the federal and state regulations.

Section 2 - Definitions

2.1 – General Definitions

Closed-Circuit Television (CCTV) – The means by which the internal condition of a pipe or other subsurface structure is visually inspected.

Collection System – The network of pipes, manholes, pump stations, and associated appurtenances that conveys wastewater to the wastewater treatment plant.

Environmental Protection Agency (EPA) – United States Environmental Protection Agency, Region 4. Federal regulatory agency with respect to the Clean Water Act and Consent Decree.

Force Main Sewer – A pressurized sewer line that conveys wastewater to some point in the gravity collection system or to the wastewater treatment plant.

Full Time Employee (FTE) – Individual employed by WMU working a regular 40-hour work week.

Gravity Sewer – A sewer line that utilizes gradient to transport wastewater to a pump station or the wastewater treatment plant.

Geographic Information System (GIS) – A spatially related, automated mapping database maintained by WMU of WMU's collection system and appurtenant structures.

Kentucky Division of Water (KDOW) – State regulatory agency with respect to the Clean Water Act and Consent Decree.

Manhole – Structure within the sanitary sewer collection system that can be accessed to visually inspect and maintain the collection system. Typically located at intersections with other line sections or changes in vertical elevations.

Private Sewer – A sewer not meeting any or a portion of the criteria for ownership and perpetual maintenance by WMU as set forth in WMU Policy 408.1.

Pump Station – That part of the sanitary sewer collection system responsible for conveying sewage under pressure from a gravity portion of the sewer collection system to another gravity sewer or to the treatment plant.

Sanitary Sewer Overflow – Discharge of sewage from anywhere other than a permitted discharge point to the waters of the Commonwealth or to wet weather ditches that discharges to waters of the Commonwealth.

Sanitary Sewer Overflow Response Plan (SORP) – Guidance document delineates WMU's options for responding to sanitary sewer system overflows.

Service Lateral – pipes that convey sewage from homes and businesses and transport that sewage to the publicly-owned, collection system.

Waters of the Commonwealth – Any and all rivers, streams, creeks, lakes, ponds, impounding reservoirs, springs, wells, marshes, and all other bodies of surface or ground water, natural or artificial, situated wholly or partly within or bordering upon the Commonwealth or its jurisdiction as defined by KRS 224.01-010.

Winchester Municipal Utilities – The full and complete supervision, management and control of the combined and consolidated garbage disposal, water works and sewer system, including the collection, deposit and expenditures of all funds constituting, directly or indirectly, income or revenues of the combined and consolidated system and the maintenance, operation, and extension and improvement of said system.

WMU Cleanout – A vertical pipe with a removable cap extending from a service lateral to the surface of the ground. It is used for access to the service lateral from the limits of the easement or the right-of-way to the publicly-owned, gravity sewer for inspection and maintenance. Typically, the WMU cleanout is located at the limit of the easement or right-of-way line.

Section 3 – System and Organizational Structure

3.1 – WMU Wastewater System

Currently, WMU provides wastewater service to 11,533 residential, commercial, institutional, and industrial customers. The WMU wastewater treatment and collection system is comprised of the following.

- 137.7 miles of gravity sewer
- 9.8 miles of force main sewer
- 0.8 miles of private sewer (including 1 private pump station)
- 3,585 manholes
- 17 pump stations
- 1 wastewater treatment plant

A new 7.2 MGD average day with 24.0 peak hydraulic wastewater treatment plant became operational January 21, 2008. The new facility will utilize influent pumping, screening, biological nutrient removal system (BNR), oxidation ditches, clarification, ultraviolet disinfection, and post aeration. Discharge is to Strodes Creek a tributary to the Licking River watershed.

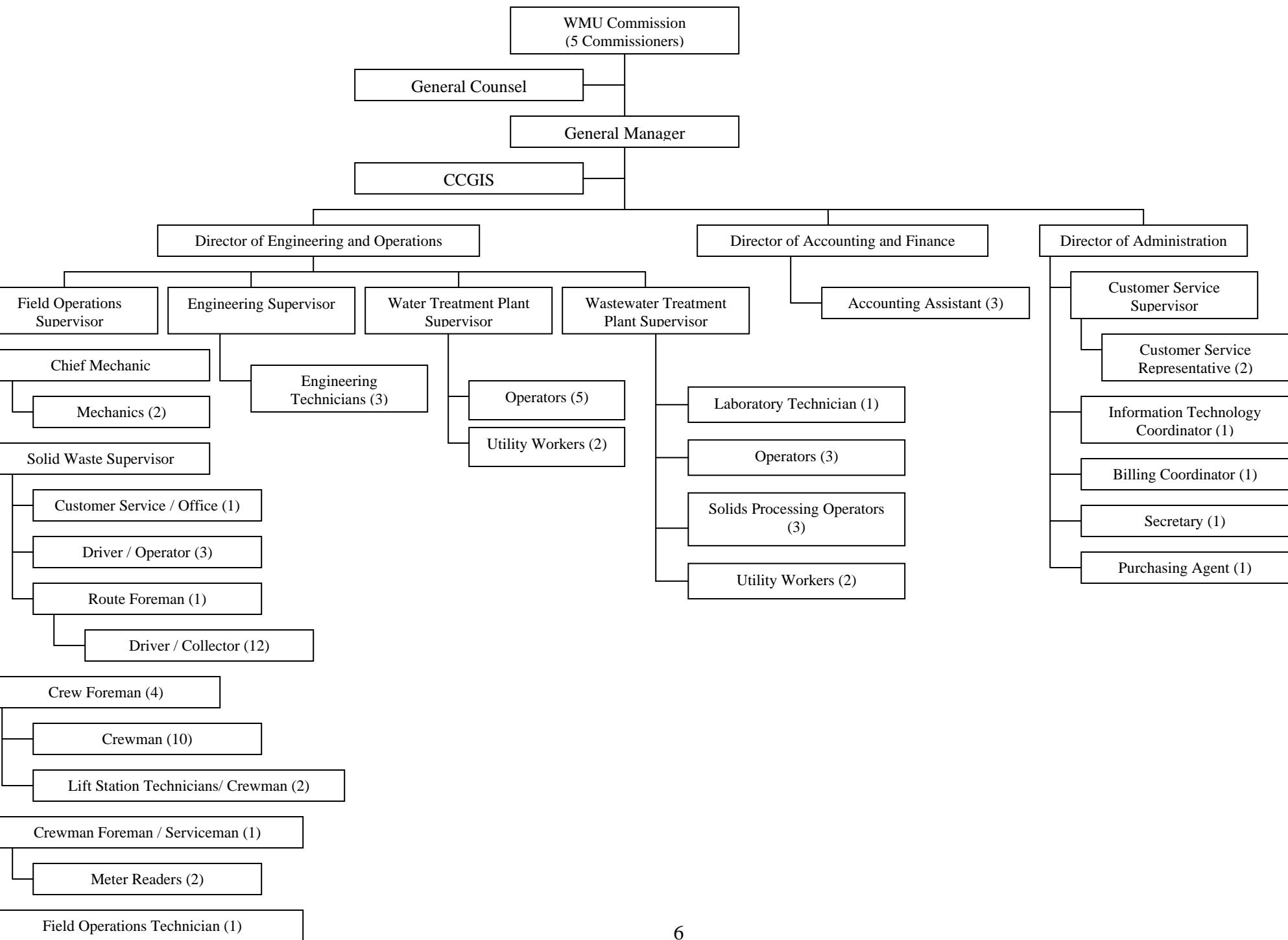
WMU owns and maintains the collection system and appurtenances that transports wastewater to the treatment plant. WMU Policies 402.2 and 408.1, (Appendix A), establish points of ownership and maintenance for the utility and the customer. In general, WMU owns and maintains the sanitary sewer system to the right-of-way or easement limit. Typically, a cleanout is located at the right-of-way or easement limit to establish the point of responsibility. A private sanitary sewer

line is defined in WMU Policy 408.1 and maintained per WMU Policy 203.1, (Appendix A). In the event an SSO occurs on a private sanitary sewer and repair or maintenance is required to protect the public health, safety, and welfare of the general public, work **may** be initiated by WMU to alleviate, eliminate, or mitigate the problem.

3.2 – WMU Organizational Structure

A copy of WMU's organizational structure is shown in Figure 1: WMU Organization Chart.

WMU ORGANIZATION CHART



3.3 – WMU Resources

A portion or all of the following resources will be utilized to perform Routine Hydraulic Cleaning of the sanitary sewer collection system.

- Combination rodder/vaccum truck (1)
- Jet rodder truck (1)
- Utility crew trucks (one equipped with crane) (3)
- Standard pick-up trucks (6)
- CCTV inspection equipment and truck (1)
- Full-Time Employees (FTEs dedicated) (3)
- Full-Time Employees (FTEs as-needed basis) (14)
- Sewer mapping (GIS based)

WMU will utilize internal resources to perform the preventative maintenance required as part of the routine hydraulic cleaning program. WMU will dedicate one (1) crew of three (3) men to implement the Routine Hydraulic Cleaning Program. Additional FTE's will be utilized on an as-needed basis.

Section 4 – Cleaning Schedule

WMU maintains a spatially related database of its sanitary sewer lines and appurtenances. The sanitary sewer lines (GIS) sections are located in five (5) watersheds that are divided into a total of fourteen (14) subwatersheds (see Appendix B). WMU owns and maintains collection system lines in eight (8) of the fourteen (14) subwatersheds.

The cleaning schedule within of the line sections within the eight (8) subwatersheds is based upon WMU's knowledge of the system, sanitary sewer overflows (SSOs) in the subwatershed, and age of the collection system in the subwatershed.

Per the cleaning schedule as listed in Appendix C, crews will begin the line sections furthest upstream in the subwatershed and continue downstream to junction manholes (locations where lines come together at a manhole) in a systematic approach. Crews will not move downstream until each line section upstream of a junction manhole has been cleaned. Using this approach cleaning activities will culminate at the lower end of the watershed.

Assuming that WMU staff has 200 working days in a calendar year and can effectively clean approximately three (3) line sections or 900 feet per day, it should take approximately four (4) years to clean the 137.7 miles of gravity sewer. CCTV inspection will be utilized during the cleaning activities on an as-needed basis and as directed by management. Once the entire system has been cleaned the process will start over provided review of the program does not determine a need to reprioritize the cleaning schedule.

Standard Operating Procedures for cleaning and CCTV inspection have been established (see Appendix D).

Section 5 – Records Management

5.1 – Work Performed

GIS database mapping will be used to identify specific sanitary sewer line sections to be cleaned. Work performed as part of the cleaning program will be documented on the Hydraulic Cleaning/Camera Report Form (see Appendix E) and incorporated into the GIS information database. WMU will follow standard operating procedures for cleaning the line sections as shown in Appendix D. Report forms will be filed and maintained for future reference.

Upon completion of the hydraulic cleaning, some line sections at various locations will be televised with the CCTV inspection equipment at various locations to verify effectiveness of the cleaning and identify any problem areas. Standard operating procedures for CCTV inspection are identified in Appendix D. Any follow-up fieldwork required as part of these activities will be reported to WMU management.

5.2 – Service Calls

Hydraulic cleaning of a specific sanitary sewer line section may be necessary as proper response to a report of a potential SSO event including but not limited to line blockages, building back-ups, and wet weather events. A work order (see Appendix E) will be generated and a Crew Foreman or the Supervisor of Field Operations will be promptly notified in order that proper personnel can be dispatched to the reported location for assessment of the situation. If hydraulic cleaning of a line section is performed the Hydraulic Cleaning/Camera Report Form (see Appendix E), including the work order will be completed, filed, and maintained for future reference. Identification of problem areas will enhance WMU's ability to eliminate potential future SSOs and to perform required maintenance activities in these areas. SSOs will be addressed per the provisions of the approved Sewer Overflow Response Plan (SORP).

Upon completion of the hydraulic cleaning, line sections will be televised with the CCTV inspection equipment to verify effectiveness of the cleaning and identify any problem areas. Any follow-up fieldwork required as part of these activities will be reported to management.

Section 6 – WMU Personnel Training

WMU management will provide and repeat training for the crews and support staff to ensure effectiveness of the Routine Hydraulic Cleaning Program. Training will occur on an as-needed basis for all personnel involved with implementation of this program and its procedures.

WMU management will oversee implementation of the Routine Hydraulic Cleaning Program and ensure that established procedures are being followed during field operations.

Section 7 – Program Updates

WMU management will review the Routine Hydraulic Cleaning Program annually and amend as appropriate. Copies of the program and amendments will be distributed to WMU personnel directly responsible for performing the activities associated with Routine Hydraulic Cleaning Program. Revisions or updates will be annotated in the Revision/Update Log (see Appendix E).

APPENDICES

Appendix A: Related WMU Policies

WMU Policy 402.2

WMU Policy 408.1

WMU Policy 203. 1

Appendix B: Maps

Master Watershed Map

Individual Watershed Maps

Appendix C: Schedule

Cleaning Schedule

Appendix D: Standard Operating Procedures

Hydraulic Cleaning

CCTV Inspection

Appendix E: Report Forms

Hydraulic Cleaning/Camera Report Form

Work Order (Sample)

Revision/Update Log

APPENDIX A

RELATED WMU POLICIES

WINCHESTER MUNICIPAL UTILITIES
POLICY AND PROCEDURES

SECTION: 400

SECTION NUMBER: 402.2

EFFECTIVE DATE: 09-03

SUBJECT: MINIMUM LEVEL OF SERVICE
FOR WATER, SANITARY
SEWER, AND FIRE LINE
EXTENSIONS

RE: ORDINANCE NO. 14-139

STATEMENT OF POLICY - The WMU Commission has established a minimum level of service for water, sanitary sewer, and fire line extensions. The minimum level of service requirements are:

Water:

- Minimum working pressure of 30 psi.
- Minimum residual pressure of 20 psi.
- WMU will maintain the WMU water service line to the meter, as defined in Policy 408.1. Water meters shall be located within the right-of-way or easement limit.

Sanitary Sewer:

- Sanitary sewers shall be of sufficient depth to receive wastewater from the first, grade-level floor served by gravity. In areas where the first, grade-level floor served is below the top of either of the two adjacent WMU maintained manholes or where basement service is provided but the basement floor elevation does not meet minimum requirements with respect to the two adjacent WMU maintained manholes, neither the city of Winchester nor the Winchester Municipal Utilities shall be responsible for backups of the sanitary sewer system resulting in personal property damage, in accordance with Section 14-139 of the City of Winchester Code of Ordinances.
- WMU will maintain the WMU sanitary sewer service lateral to the sanitary sewer service lateral clean-out, as defined in Policy 408.1. Clean-outs shall be located within the right-of-way or easement limit.

Fire Line:

- Minimum fire flow shall be 1,000 gpm for two hours in the following corridors:
 1. Industrial Park;
 2. Bypass Area;
 3. Central Business District, (bound by Maple Street, Iron Works Road, Highland Street, and Boone Avenue); and
 4. Lexington Avenue, Maryland Avenue to Bon Haven, McCann Drive, and Floyd Clay Drive.
- All other areas shall have a minimum fire flow of 750 gpm for two hours.
- WMU will maintain the fire line from the water main up to the first valve of the backflow prevention device located inside the vault. The fire line and vault shall be located within the right-of-way or easement limit.

STATEMENT OF PROCEDURE - All plans and specifications shall be reviewed in accordance with WMU established design standards and minimum level of service requirements.

Builders/property owners shall be given a copy of this policy at the time service is requested. It is the builders/property owner's responsibility for determining compliance with Section 14-139 of the City of Winchester Code of Ordinances prior to occupancy of any residential or commercial building.

Approved By - WMU Commission

Date

WINCHESTER MUNICIPAL UTILITIES
POLICY AND PROCEDURES

SECTION: 400

SECTION NUMBER: 408.1

EFFECTIVE DATE: 11-96

SUBJECT: EXTENSION OF WATER
AND/OR SANITARY SEWER
LINES

RE: ORDINANCE NO. N/A

STATEMENT OF POLICY - Water and sanitary sewer services shall be designed and constructed to the satisfaction of the WMU Commission such that the water and/or sanitary sewer lines shall be extended to the nearest property line of the last property or lot to be served.

A water and/or sanitary sewer main extension shall be required where there does not exist a WMU owned water and/or sanitary sewer main within 100 feet of the property or lot to be served or where, in the opinion of the Utilities Engineer, there is potential for further extension.

A water and/or sanitary sewer main extension shall not be required where there exists a WMU owned water and/or sanitary sewer main within 100 feet of the property or lot to be served and where, in the opinion of the Utilities Engineer, there is no potential for further extension. A WMU water service line shall be installed from the water main to the property line or easement limit. A WMU sanitary sewer service lateral shall be installed from the sanitary sewer main to the property line or easement limit.

All water mains, WMU water service lines, sanitary sewer mains, and WMU sanitary sewer service laterals, shall be in a dedicated easement or in a public right-of-way. In no case shall a building water service line or a building sanitary sewer service lateral extend across any property which is not part of the property to be served.

Effective with the date of this policy, connections of lots or properties to private water mains or private sanitary sewer mains shall not be permitted.

DEFINITIONS - Water Main - All water mains shall be a minimum of six (6) inches in diameter and shall conform to the WMU standard specifications and details for water lines. A fire hydrant shall be installed at the end of all water mains. Water mains are owned, operated, and maintained by WMU.

WMU Water Service Line - All WMU water service lines shall be a minimum of 3/4 inch in diameter and shall conform to the WMU standard specifications and details for water service connections. WMU water service lines shall transport water from the water main to the water meter. WMU water service lines are to be used by no more than two entities and each entity shall have its own water meter. Service lines serving two entities shall be 1 inch in diameter. The length of a WMU water service line shall not exceed 100 feet. A water meter setting shall be installed at the end of all WMU water service lines. WMU water service lines and water meter settings are owned, operated, and maintained by WMU. The water meter is the limit of WMU's responsibility.

Building Water Service Line - All building water service lines shall be a minimum of 3/4 inch in diameter and shall conform to the Kentucky State Plumbing Code. Building water service lines shall transport water from the water meter to the building served. Building water service lines are to be used by one entity only. Building water service lines are owned, operated, and maintained by the property owner.

Private Water Main - A water main serving one or more buildings; and for which there is no record of dedication to WMU; and/or for which there is no recorded or platted easement in

favor of WMU; and/or which is not maintained by WMU; and/or which crosses a separate tract of land other than the one being served; and/or which exceeds 100 feet in length on the tract of land which is not being served; and which is at some point connected to a waterline which is owned and maintained by WMU.

Sanitary Sewer Main - All sanitary sewer mains shall be a minimum of eight (8) inches in diameter and shall conform to the WMU standard specifications and details for sanitary sewers. A manhole shall be installed at the end of all sanitary sewer mains. Sanitary sewer mains are owned, operated, and maintained by WMU.

WMU Sanitary Sewer Service Lateral - All WMU sanitary sewer service laterals shall be a minimum of six (6) inches in diameter and shall conform to the WMU standard specifications and details for sanitary sewer service laterals. WMU sanitary sewer service laterals shall transport sewage from the property line or easement limit to the sanitary sewer main. WMU sanitary sewer service laterals shall be used by one entity only. The length of a WMU sanitary sewer service lateral shall not exceed 100 feet. A clean-out shall be installed at the end of all WMU sanitary sewer service laterals. WMU sanitary sewer service laterals are owned, operated, and maintained by WMU. The clean-out is the limit of WMU's responsibility.

Building Sanitary Sewer Service Lateral - All building sanitary sewer service laterals shall be a minimum of four (4) inches in diameter and shall conform to the Kentucky State Plumbing Code. Building sanitary sewer service laterals shall transport sewage from the building served to the WMU sanitary sewer service lateral. Building sanitary sewer service laterals are to be used by one entity only, except as established in Section 14-141 of the Code of Ordinances of the City of Winchester. Building sanitary sewer service laterals are owned, operated, and maintained by the property owner.

Private Sanitary Sewer Main - A sanitary sewer main serving one or more buildings; and for which there is no record of dedication to WMU; and/or for which there is no recorded or platted easement in favor of WMU; and/or which is not maintained by WMU; and/or which crosses a separate tract of land other than the one being served; and/or which exceeds 100 feet in length on the tract of land which is not being served; and which is at some point connected to a sanitary sewer which is owned by WMU; except as defined by City of Winchester Code of Ordinance 14-141.

STATEMENT OF PROCEDURE - Developers, builders, or property owners desiring WMU water or sanitary sewer service for a property or lot that currently does not have a WMU owned water and/or sanitary sewer main within 100 feet of the property or lot to be served shall submit to WMU a plan or schematic of the proposed connections. WMU shall review said plan or schematic to ensure its compliance with this policy.

If an extension of water and/or sanitary sewer service is required, plans and specifications shall be submitted in accordance with Policy No. 401.1. Connection to the sanitary sewer system by force main sewer shall constitute an extension. System development charges (SDCs) and all applicable tap fees shall apply on all water and sanitary sewer extensions.

If an extension of water and/or sanitary sewer service is not required, water and sanitary sewer tap fees shall be paid in accordance with Policy Nos. 104.1, 201.1, and 202.1.

Chairman - WMU Commission

Date

WINCHESTER MUNICIPAL UTILITIES
POLICY AND PROCEDURES

SECTION: 200

POLICY NUMBER: 203.1

EFFECTIVE DATE: 11-05-98

SUBJECT: PRIVATE SANITARY
SEWER REPAIR AND MAINTENANCE

STATEMENT OF POLICY – The Winchester Municipal Utilities (WMU) will not repair or maintain any portion of any private sanitary sewer except under the following conditions: (1) when immediate emergency repair or maintenance is required for the protection of the public health, safety, and welfare or (2) when immediate repair or maintenance is required on facilities that are not known at the time to be a private sanitary sewer. The performance by WMU of emergency repair or maintenance on a private sanitary sewer shall not constitute an act of acceptance of the subject private sanitary sewer, or any component thereof, into the public sanitary sewer system.

STATEMENT OF PROCEDURE – Upon receiving a call for immediate or emergency repair or maintenance of a sanitary sewer, the request will be forwarded to the Operations Department which will assess the problem and make a determination as to the appropriate response. The following actions may occur as they relate to a private sanitary sewer: (1) If the subject sanitary sewer is known to be a private sanitary sewer and emergency repairs are not required, the customer will be informed immediately by the Operations Department that WMU does not own the subject facilities and that WMU does not repair or maintain a private sanitary sewer. (2) If the subject sanitary sewer is known to be a private sanitary sewer and emergency repairs are required to protect the public health, safety, and welfare. WMU may initiate necessary emergency repair or maintenance. At the same time, the customer will be informed by the Operations Department that WMU does not repair or maintain a private sanitary sewer, and that only emergency repair and maintenance will be performed. WMU will invoice through miscellaneous billing for emergency repairs to private sewers. (3) If repair or maintenance is performed on sanitary sewer facilities which are not known at the time to be a private sanitary sewer, the customer will be informed immediately upon identification of the facilities as a private sanitary sewer that WMU does not own the subject facilities, that WMU does not repair or maintain a private sanitary sewer, and that no further repair or maintenance will be performed on the subject facilities. Any question regarding the identification of a private sanitary sewer shall be directed to the Operations Department.

DEFINITION – Private Sanitary Sewer – A “private sanitary sewer main” is defined in policy number 408.1.

Approved by WMU Commission

APPENDIX B

APPENDIX C

SCHEDULE

WMU Routine Hydraulic Cleaning Schedule

1. Strodes Creek, Basin C
2. Strodes Creek , Basin A
3. Strodes Creek, Basin B
4. Strodes Creek, Basin D
5. Lower Howard Creek, Basin A
6. Hoods Creeks
7. Four Mile Creek, Basin A
8. Four Mile Creek, Basin B

APPENDIX D

STANDARD OPERATING PROCEDURES

Routine Hydraulic Cleaning Standard Operating Procedures

1. Watershed mapping provided by GIS will be used to schedule line sections for routine hydraulic cleaning.
2. Cleaning will be initiated at the most upstream line sections in the watershed and move downstream in a systematic approach to junction manholes (locations where lines come together at a manhole). Crews will not move downstream to the next line section until each line section introducing flow to a junction manhole has been cleaned.
3. Line segment cleaning will be down gradient.
4. Approved traffic control practices will be implemented when performing operations in street rights-of-way.
5. Controls should be established at the downstream manhole (where cleaning activities are occurring) to ensure debris does not escape to the downstream line section. With use of the combination rodder/vacuum truck, the vacuum will provide a means to retrieve debris from cleaning activities. With use of the standard jet rodder truck a screened basket will be placed in the downstream section of the manhole to retrieve debris. Placement of the basket will not require entrance to the manhole. **At no time should a crew member enter a manhole unless proper confined space entry procedures have been initiated.**
6. A cleaning nozzle that best fits the application will be selected for cleaning specific line sections.
7. With initiation of the cleaning activities the nozzle should be propelled up the line section to a termination point identified prior to the starting of the cleaning operation. This is typically a manhole with the cover removed in order that a member of the crew can verify that the line section has been cleaned in its entirety. Depending on the amount of debris in the line section, an entire section of line may not be able to be cleaned with the first attempt. Experience and manufacturer's recommendations will be the guide with respect to pump pressures to achieve proper water velocities for cleaning.
8. The hose and nozzle should be reeled in until it is just outside the downstream manhole in order that the debris can be collected with the vacuum unit.
9. Step in Nos. 1 – 8 will be repeated until visual inspection identifies that no debris is present.
10. The Hydraulic Cleaning/Camera Report Form will be completed for each line section cleaned.
11. Annotate (highlight) on GIS mapping that the line section has been cleaned.
12. Move to the next line section.

Routine Closed Circuit Television (CCTV) Inspection Standard Operating Procedures

1. Watershed mapping provided by GIS will be used to schedule line sections for routine CCTV inspection.
2. Typically, routine hydraulic cleaning activities will have preceded CCTV inspection.
3. CCTV inspection will begin in the upstream manhole of a line section and move downstream to the next manhole in the line section. If field conditions warrant that operations be initiated at the downstream manhole CCTV inspection crew members shall verify flows will allow CCTV activities.
4. Approved traffic control practices will be implemented when performing operations where applicable.
5. Operation and maintenance of the CCTV equipment will be per manufactures recommendations.
6. A VHS tape or DVD will be made of each line section televised.
7. Complete the Hydraulic Cleaning/Camera Report Form for the line section televised.
8. Annotate (highlight) on GIS mapping that the line section has been televised.
9. Move to the next line section.

APPENDIX E

REPORT FORMS

WORK ORDER

