

## Program Background

The Water Works and Sanitary Sewer Board of the City of Montgomery (Board) began an interceptor improvements project in 1990 for its three major sewer basins that evaluated the following four wet weather infiltration/inflow control measures:

- Reducing the percentage of extraneous infiltration/inflow;
- Constructing offline or inline storage facilities;
- Enlarging the conveyance piping to the wastewater treatment plant; and
- Enlarging the wastewater treatment plant to handle the added wet weather loads.

Evaluation results showed that different combinations of the four control measures for each basin provided the most cost-effective solution to handle the selected design storm conditions.

In 1994, the Board began infiltration and inflow source detection activities through manhole inspections and smoke testing. The purpose of these activities was to locate defects that allow extraneous water to quickly enter the sewer and generate peak flow rates in the sewer.

Historically, the Board placed sole responsibility for lateral maintenance with the property owner. The Board only made repairs to the lateral connection at the sewer main (located on public property), and sometimes to the lower lateral if it was associated with a capital improvements project. When smoke testing revealed a significant number of infiltration/inflow defects located on the private service lateral, the Board was faced with the need to address the upper lateral. It was agreed that the lateral policy should be revised and a more aggressive lateral program should be adopted. The current Private Lateral Management System (PLMS) is comprised of the following elements:

- Public Awareness and Information;
- Automated Data Collection;
- Property Owner Notification System; and,
- Repair Options.

## The Private Lateral Management System

### Public Awareness and Information

Notification of smoke testing activity and the owner's responsibility is communicated by placing a door hanger on each house or business and through personal contact for higher risk facilities, such as hospitals. If a lateral defect is discovered, a letter is sent to the property address with a brochure designed to provide information about the lateral program and to serve as educational material regarding the Board's wastewater collection system. The letter and flier provide the owner with phone contacts and the Board's web site address, [www.mwssb.com](http://www.mwssb.com).



### Automated Data Collection

The need for improved methods of recording and reporting noted defects became apparent during a sanitary sewer evaluation survey in 1994. The Board was missing major opportunities to reduce inflow and infiltration through actions as simple and inexpensive as replacing missing cleanout caps. To increase efficiency, field crews were provided with laptop computers to directly enter inspection observations rather than using hard-copy forms. Polaroid cameras were replaced with digital cameras so that photographs of the defect could be linked and inserted into the appropriate electronic inspection form in the field. The information gathered in the field was then integrated with the Board's geographical information system (GIS), which increased the Board's benefits of computerization.



### Property Owner Notification System

Owner notification and response tracking was simplified through use of a customized database. Data display buttons and menus from a software data interface screen called Generate Customer Correspondence allows the user to generate initial and follow-up correspondence (notices) based on data collected in the field and response from the property owner. Using this program, a data manager can retrieve information about a defect and respond accordingly. If a customer contacts the Board about the status of work, the data is quickly accessed and answers provided while the customer is on the phone.

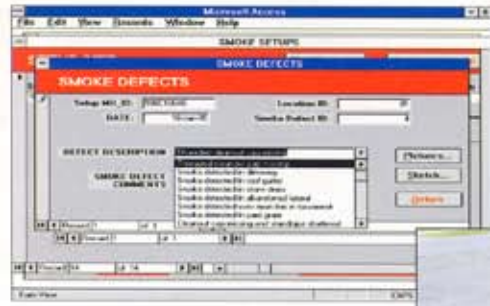
### Repair Options

The Board's Service Lateral Repair Program stipulates that property owners must repair lateral defects found during smoke testing. The owner may permit the Board to repair the lower lateral, with the cost reimbursed by the owner. A maximum reimbursement cost ceiling of \$1,200 was established to cover all lower lateral repairs, along with interest-free financing. The Board will also replace missing cleanout caps at a rate of \$13.52 per cap. If the owner makes the repair, the Board conducts another inspection to verify the work, and once the repair is complete, a *Thank You Letter* is sent accepting the work. If there is no response to the Board's notices of repair requirements within the specified time, however, water service is terminated.

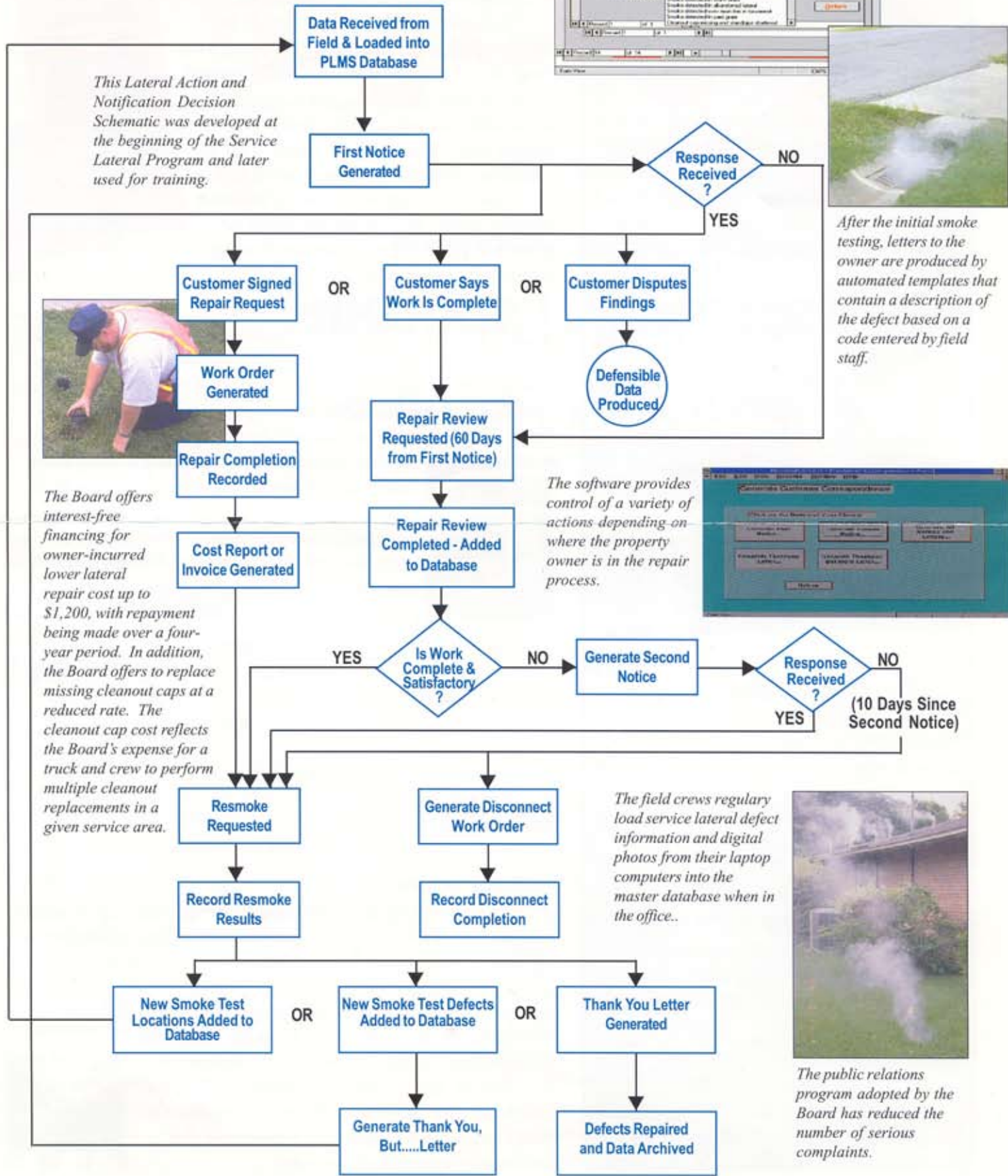




# Lateral Action and Notification Flow Chart



After the initial smoke testing, letters to the owner are produced by automated templates that contain a description of the defect based on a code entered by field staff.



*This Lateral Action and Notification Decision Schematic was developed at the beginning of the Service Lateral Program and later used for training.*



*The Board offers interest-free financing for owner-incurred lower lateral repair cost up to \$1,200, with repayment being made over a four-year period. In addition, the Board offers to replace missing cleanout caps at a reduced rate. The cleanout cap cost reflects the Board's expense for a truck and crew to perform multiple cleanout replacements in a given service area.*

*The software provides control of a variety of actions depending on where the property owner is in the repair process.*



*The field crews regularly load service lateral defect information and digital photos from their laptop computers into the master database when in the office..*



*The public relations program adopted by the Board has reduced the number of serious complaints.*



# Results of the Automated Service Lateral Repair Program

The Water Works and Sanitary Sewer Board of the City of Montgomery (Board) has used the Automated Service Lateral Repair Program since the fall of 1994, with a favorable level of participation from the public and minimal customer resistance. In the six-year period, the Board has done lateral work in 35 of 113 subbasins. The work is complete in 23 subbasins and 12 are in the process of being completed. Within the 23 completed subbasins, the Board successfully accomplished 97 percent (2,197) of the lateral defect repairs using the lateral program process. The remaining 3 percent were defects located on abandoned or unoccupied property. Since the start of the program, nearly 2.2 million linear feet of mainline sewer has been smoke tested. Of the 3,394 defects found thus far, 85 percent (2,876) were found on service laterals.

Service Lateral Summary		
Service Area Information	Defect	100% Completed
	Summary	Subbasins
Number of Subbasins Where Lateral Work Performed	35	23
Sewered Area, acres	12,869 ac	11,076 ac
Linear Feet of Sewer	2,179,540 ft	1,520,720 ft
Number of Smoke Defects Located (all types)	3,394	2,649
Number of Lower Lateral Defects	63	-
Number of Upper Lateral Defects	2,813	-
Number of Cleanout Defects (included in Upper)	1,628	-
Percent Lateral Defect Compared to All Types	85%	-
Percent Cleanout Defects Compared to All Types	58%	-
Number of Lateral Defects Successfully Repaired	-	2,197

## Infiltration/Inflow Reduction

Post-rehabilitation flow monitoring was conducted in four of the completed basins where repairs were primarily attributed to service laterals. A planned 20 percent reduction was estimated for

Post-Lateral Repair Infiltration/Inflow Reduction Measurements					
Subbasin	Subbasin Percent Lateral Defects	Number of Lateral Defects Repaired	Planned Infiltration/Inflow Reduction	Measured Infiltration/Inflow Reduction	RDI/ Volume Reduction, (Annual MG)
CL-4	100	36	20%	41%	14.9
CL-6	100	215	20%	23%	4.1
CM-17	87	88	20%	78%	15.0
TW-11	78	11	20%	24%	1.9

each subbasin. Instead, the average infiltration and inflow reduction was 42 percent. A total of 350 lateral repairs were estimated to reduce the infiltration/inflow volume by 36 million gallons, which equated to about 100,000 gallons of infiltration/inflow reduction per year per lateral.

## Public Response

The public relations steps that were implemented by the Board when it began the automated service lateral program have resulted in supportive and positive response to the program. The results show that 97 percent of the lateral defects were repaired by the property owners. In addition, 65 percent of the property owners corrected their lateral problem in response to the first notice. Then, after the second notice, all except 3 percent made the necessary lateral repair. However, 310 property owners had to have their water service disconnected to encourage them to complete the lateral repair. Of those, 63 property owners did not respond to the disconnection notice, primarily because the buildings were vacant.

Summary of Customer Response to Lateral Program in the Completed Subbasins	
Number of Lateral Defects	2,267
Number of 1st Notice Letters Sent	2,260
Number of 2nd Notice Letters Sent	796
Number of Water Service Disconnections	310
Number Defect Repairs	2,197
Percent of Lateral Defects Repaired	97%

The Board also provided a financial assistance program to property owners who had a lower lateral problem. These problems were often located in congested utility corridors and under pavement. Locations such as these caused construction costs to escalate, almost always above the \$1,200 maximum the Board set for property owners to pay. Therefore, the Board found that property owners who had lower lateral repairs that were expected to exceed \$1,200 were willing to enter into a financial agreement with the Board. Since the beginning of the program, the Board has entered into agreements with 62 customers, averaging between 15 and 16 agreements per year. Currently, the Board has 17 agreements representing about \$10,500 worth of debt financed.



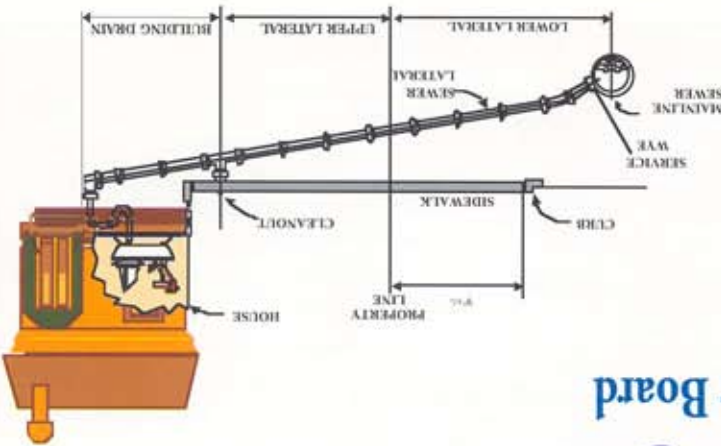
Montgomery, Alabama

of the City of Montgomery

The Water Works and Sanitary Sewer Board

# Lateral Repair Program An Automated Service

A Private Service Lateral is the buried pipe that connects residential, commercial, or other buildings to the publicly owned mainline sewer, which is usually located in the street, in an alley behind the structure, or in an adjoining easement. Service laterals may also be referred to as house sewers, service mains, house services, or building sewers.



## Implementation

## Mechanics

The Water Works and Sanitary Sewer Board of the City of Montgomery (Board) faced several challenges in the implementation of the Automated Service Lateral Program including program process development and training, personnel and equipment costs, specification revisions, and public response. The Board also incorporated important feedback into the program after a suggestion was evaluated and it was determined that feedback would improve the program. Several of the improvements that developed were procedural, but they will have long-term dividends. The following is a breakdown of some of the program logistics.

### Cost Items

#### Personnel

- Permanent Staff
- Sewer Service Mechanic
- Utility Crew
- Office Assistant/Data Manager (part-time)

#### Equipment

- Service Truck
- Smoke Testing Equipment
- Laptop and Personal Computers
- Digital Cameras

#### Support Staff

- Administrative Assistant
- Assistant General Manager
- Consulting Assistance
- IT Support Staff

### Building Specifications

The Board requires an air test on new mainline sewers and laterals stubbed onto property or an easement. In addition, the Board found it beneficial to revise its *Standard Specifications* to state that the air test cannot be conducted until after the mainline sewer and the lateral are backfilled and all other utilities are installed, final grading is completed, and the base layer of asphalt is spread. The demolition procedure that contractors used to plug a lateral was also revised to require a demolition contractor to expose the lateral, cut and plug it with a compression fitting while the Board witnesses concrete placement around the end of the pipe.