JMEUC PROGRAM TO ELIMINATE STORM WATER INFLOW

JMEUC TRIBUTARY / MEMBER MUNICIPALITIES

EAST ORANGE (Portion)

HILLSIDE

IRVINGTON

MAPLEWOOD

MILBURN

NEWARK (Portion)

ROSELLE PARK (Portion)

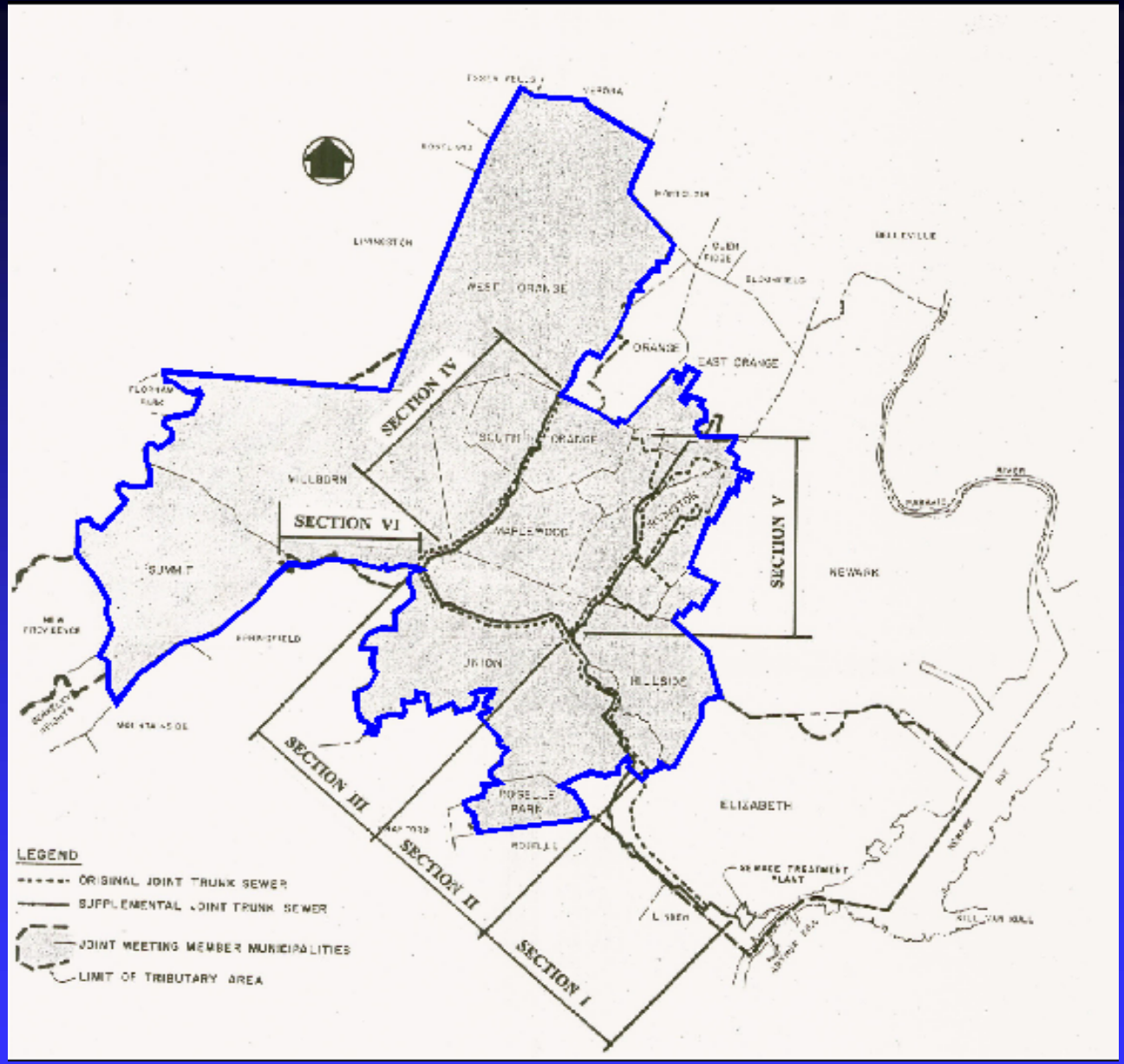
SOUTH ORANGE

SUMMIT

UNION

WEST ORANGE

ELIZABETH (Customer)


SECTION IV
SECTION VI
SECTION V
SECTION III
SECTION II
SECTION I
WEST ORANGE
ORANGE
EAST ORANGE
SOUTH ORANGE
MAPLEWOOD
MILLBURN
SUMMIT
NEWARK
ELIZABETH
HILLSIDE
UNION
LEGEND
ORIGINAL JOINT TRUNK SEWER
SUPPLEMENTAL JOINT TRUNK SEWER
JOINT MEETING MEMBER MUNICIPALITIES
LIMIT OF TRIBUTARY AREA

JMEUC WASTEWATER TREATMENT PLANT		
DESCRIPTION	FLOW	UNITS
RATED CAPACITY	85	MGD
AVERAGE DAILY DRY WEATHER FLOW	60	MGD
WET WEATHER FLOW	UP TO 185	MGD

HISTORY OF INFLOW PROBLEM

DEFINITION OF INFLOW

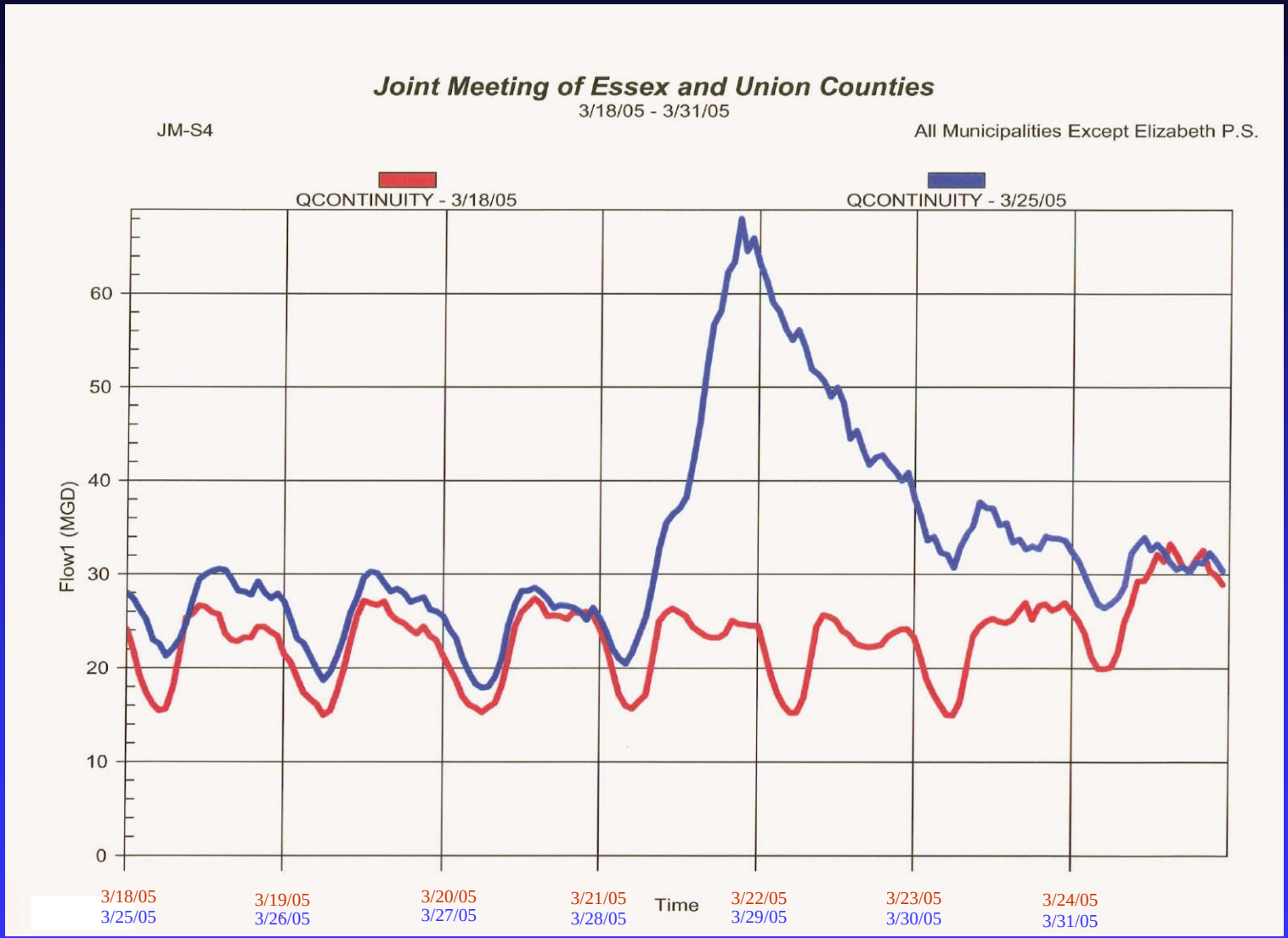
Inflow is defined as storm water that enters a sanitary sewer system as a result of broken or uncapped cleanouts, storm drain connections, roof leader tie-ins, sump pump discharges from building foundations/basement drains or through vented manhole covers.

HISTORY OF INFLOW PROBLEM

SEVERITY OF INFLOW

- DURING WET WEATHER EVENTS, FLOW INCREASES TO THE JMEUC WWTP BY AS MUCH AS 125 MGD
  - WET WEATHER FLOW – AVERAGE DAILY FLOW
  - 185 MGD – 60 MGD = 125 MGD
- DURING WET WEATHER EVENTS JMEUC WWTP EXCEEDS RATED CAPACITY BY AS MUCH AS 100 MGD
  - WET WEATHER FLOW – RATED CAPACITY
  - 185 MGD – 85 MGD = 100 MGD

TYPICAL RAINFALL GRAPH



DURING WET WEATHER EVENTS FLOW INCREASES BY 45 MGD

IN THIS TRIBUTARY AREA

HISTORY OF INFLOW PROBLEM

WET WEATHER BY-PASS STUDY

- PREVIOUSLY, EXCESS WET WEATHER FLOW BY-PASSED SECONDARY TREATMENT AT THE WWTP
  - ORIGINAL BY-PASS THRESHOLD WAS 120 MGD
  - WET WEATHER FLOW CAN BE AS MUCH AS 185 MGD
- IN APRIL 2003, NJDEP REVISED JMEUC'S PERMIT REQUIREMENTS
  - NO LONGER ALLOW BY-PASSES
  - JMEUC FACES NJDEP FINES FOR ANY BY-PASSES THAT OCCUR
- A RECENT HYDRAULIC STUDY OF THE WWTP
  - DETERMINED THE FLOW THAT THE WWTP COULD PROPERLY TREAT DURING SHORT-TERM WET WEATHER EVENTS
  - DETERMINED THAT THE BY-PASS THRESHOLD SHOULD BE MODIFIED TO 185 MGD

REASONS WHY PROBLEM SHOULD BE RESOLVED

- TO AVOID FUTURE FINES BY NJDEP FOR WET WEATHER BY-PASSES. BY-PASS THRESHOLD WAS MODIFIED TO 185 MGD.
  - HOWEVER, INFLOW WILL ONLY INCREASE IF NOT ADDRESSED.

REASONS WHY PROBLEM SHOULD BE RESOLVED

- TO AVOID A CAPACITY UPGRADE AT THE JMEUC WWTP
  - SIGNIFICANT CONSTRUCTION COST
  - COST WOULD BE BORNE BY THE JMEUC'S MEMBER MUNICIPALITIES

REASONS WHY PROBLEM SHOULD BE RESOLVED

- TO EXTEND THE LIFE CYCLE OF THE FACILITY EQUIPMENT
  - FLOODING EQUIPMENT WILL CAUSE DAMAGE
  - LESS FLOW = LESS WORK = LONGER LIFE SPAN = LESS ENERGY REQUIRED

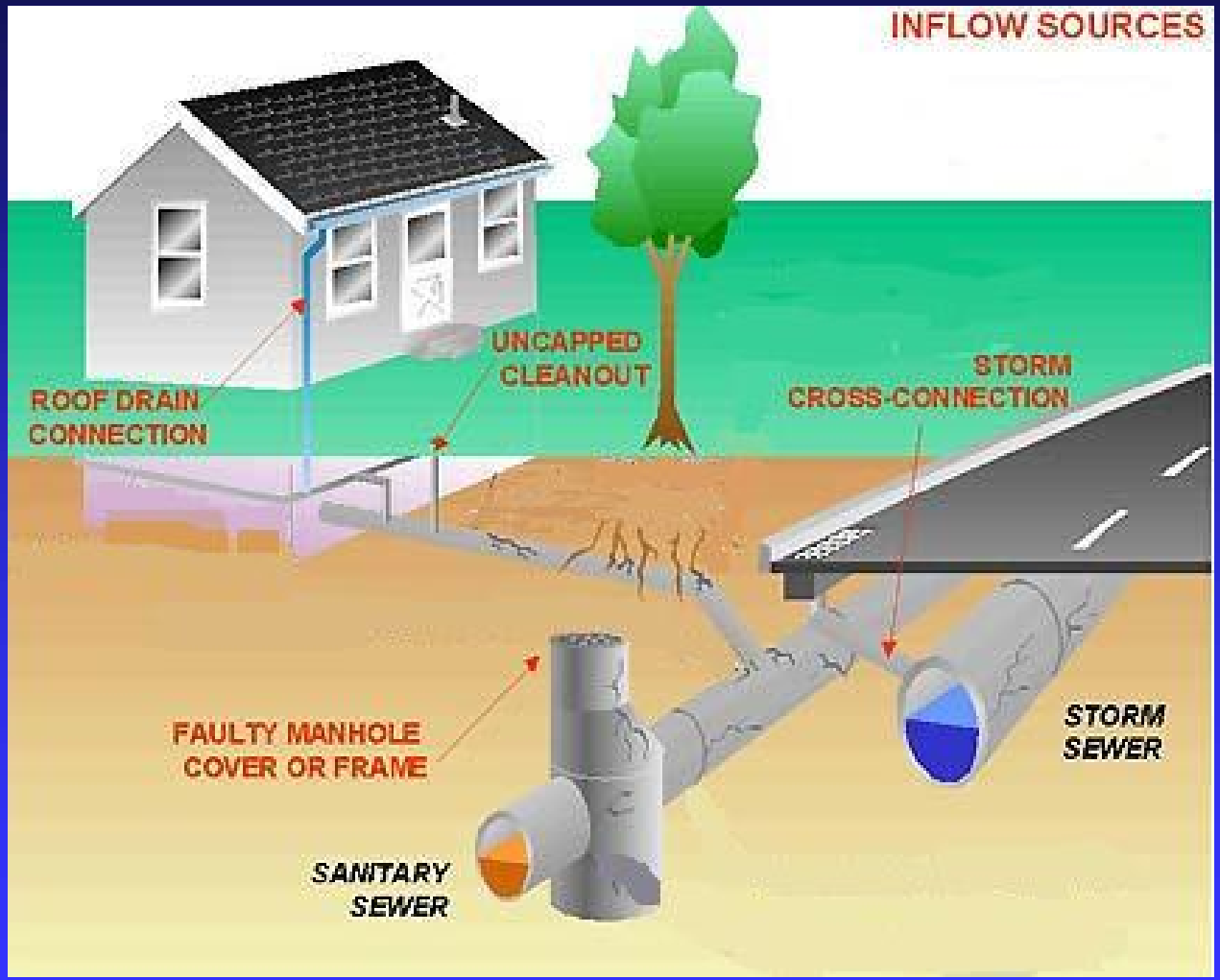
REASONS WHY PROBLEM SHOULD BE RESOLVED

- FOR THE PROTECTION AND PRESERVATION OF THE ENVIRONMENT AND WATERWAYS FOR FUTURE GENERATIONS
  - WHEN BY-PASSES OCCUR ONLY TREAT TO PRIMARY TREATMENT STANDARDS

REASONS WHY PROBLEM SHOULD BE RESOLVED

- TO AVOID STUNTING FUTURE DEVELOPMENT
  - IF PROBLEM PERSISTS, INFLOW WILL INCREASE
  - HYDRAULIC CAPACITY WILL NOT ALLOW FOR FUTURE CONNECTIONS TO WWTP

SOURCES OF INFLOW

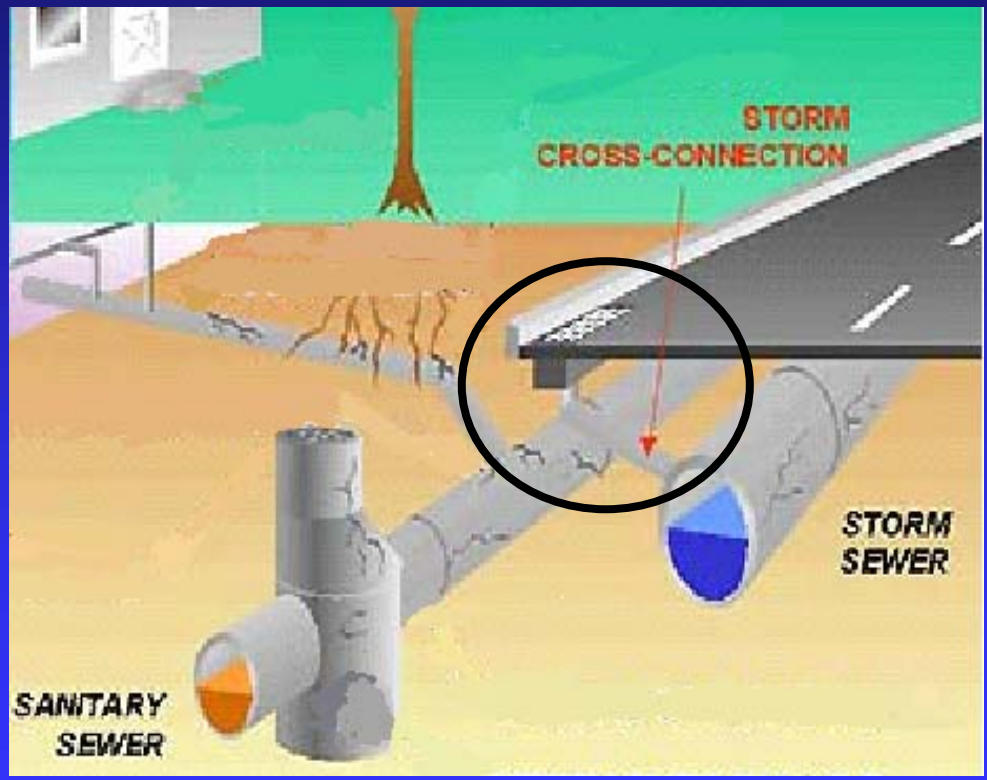


SOURCES OF INFLOW

UNCAPPED OR DAMAGED CLEANOUTS

SOURCES OF INFLOW

STORM SYSTEM CROSS CONNECTIONS



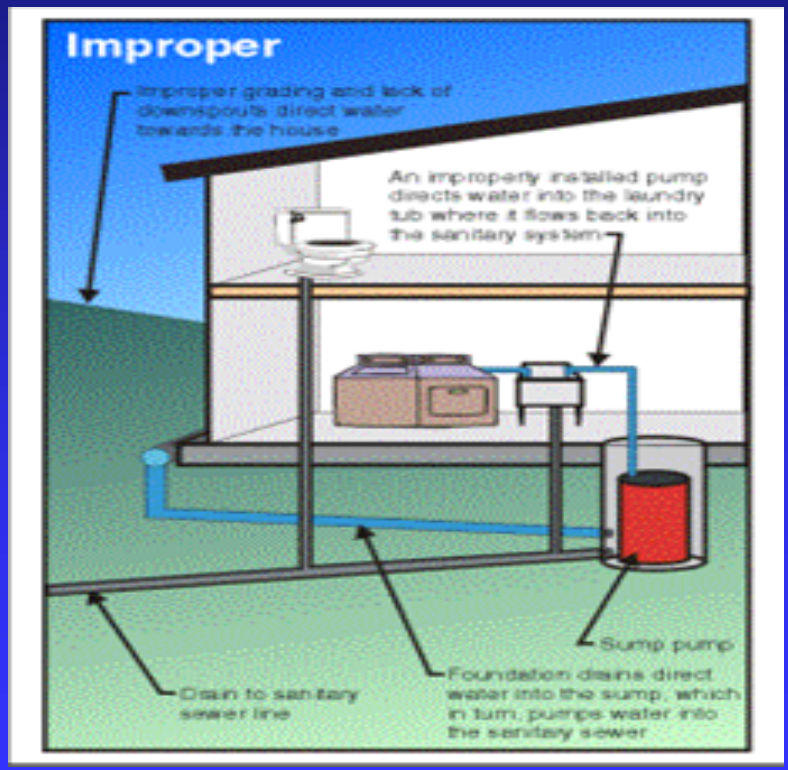
SOURCES OF INFLOW

ROOF DRAIN CONNECTION

SOURCES OF INFLOW

SUMP PUMPS

- AN IMPROPERLY INSTALLED SUMP PUMP DIRECTS WATER INTO THE LAUNDRY TUB WHERE IT FLOWS BACK INTO THE SANITARY SEWER SYSTEM



REMEDIATION MEASURES

SMOKE TESTING

SAFE, NON-TOXIC SMOKE IS RELEASED INTO THE SEWER SYSTEM TO LOCATE STORM WATER CROSS CONNECTIONS, UNCAPPED CLEANOUTS, ROOF DRAIN CONNECTIONS, AND BROKEN OR CRACKED PIPE WITHIN THE SANITARY SEWER SYSTEM.

REMEDIATION MEASURES

REMEDIATING PROBLEMS FOUND DURING SMOKE TESTING

- UNCAPPED CLEANOUTS
  - CAPPED WITH WATER TIGHT THREADED CAPS
- STORM SYSTEM CROSS CONNECTIONS
  - WHEN DISCOVERED THEY ARE ELIMINATED
- BROKEN OR CRACKED PIPE
  - PIPE LININGS
  - REPLACEMENT
  - INTERNAL GROUTING

REMEDIATION MEASURES

SEVERITY OF INFLOW FROM ROOF DRAINS

- AREA OF ROOF = 1,000 SF (20 FT x 50 FT)
- TYPICAL RAINFALL = 1.0 INCH/DAY
- ASSUME 25% OF RAIN FROM ROOF IS COLLECTED IN ONE ROOF DRAIN
- VOLUME OF FLOW ENTERING SANITARY SEWER SYSTEM FROM ONE ROOF DRAIN
  - AREA OF ROOF x (TYPICAL RAINFALL/12) x 25%
  - 1,000 SF x (1.0/12) x 25% = 21 CF/DAY = 150 GPD
- VOLUME OF FLOW FROM ALL ILLICITLY CONNECTED ROOF DRAINS
  - # OF CUSTOMERS/3 PER HOUSEHOLD x 25% (ASSUME 25% ARE INCORRECTLY CONNECTED) x 150 GPD
  - 600,000/3 x 25% x 150 GPD = APPROX. 7.5 MGD

REMEDIATION MEASURES

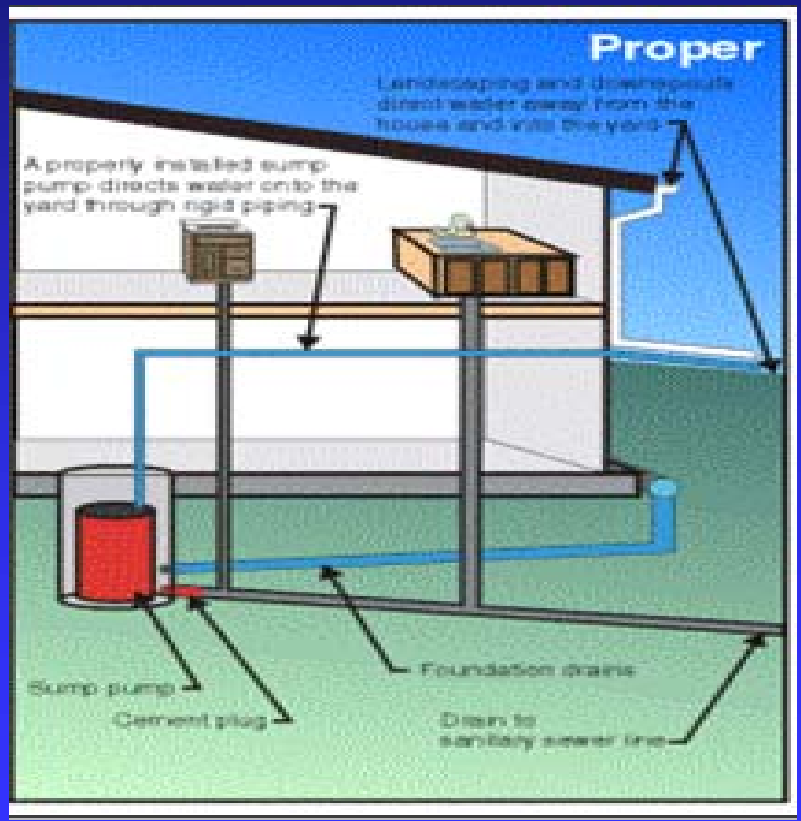
ROOF DRAIN REDIRECTION

- THE CONNECTION TO THE SANITARY SEWER SYSTEM IS REMOVED
- THE ROOF DRAIN MUST EXTEND A MINIMUM DISTANCE (DEPENDENT UPON LOCAL TOWN REQUIREMENTS) PERPENDICULAR FROM THE HOUSE FOUNDATION
- FLOW IS DIRECTED TO THE LAWN
- A SPLASH BLOCK IS INSTALLED IN ORDER TO PROTECT THE GROUND FROM EROSION

REMEDIATION MEASURES

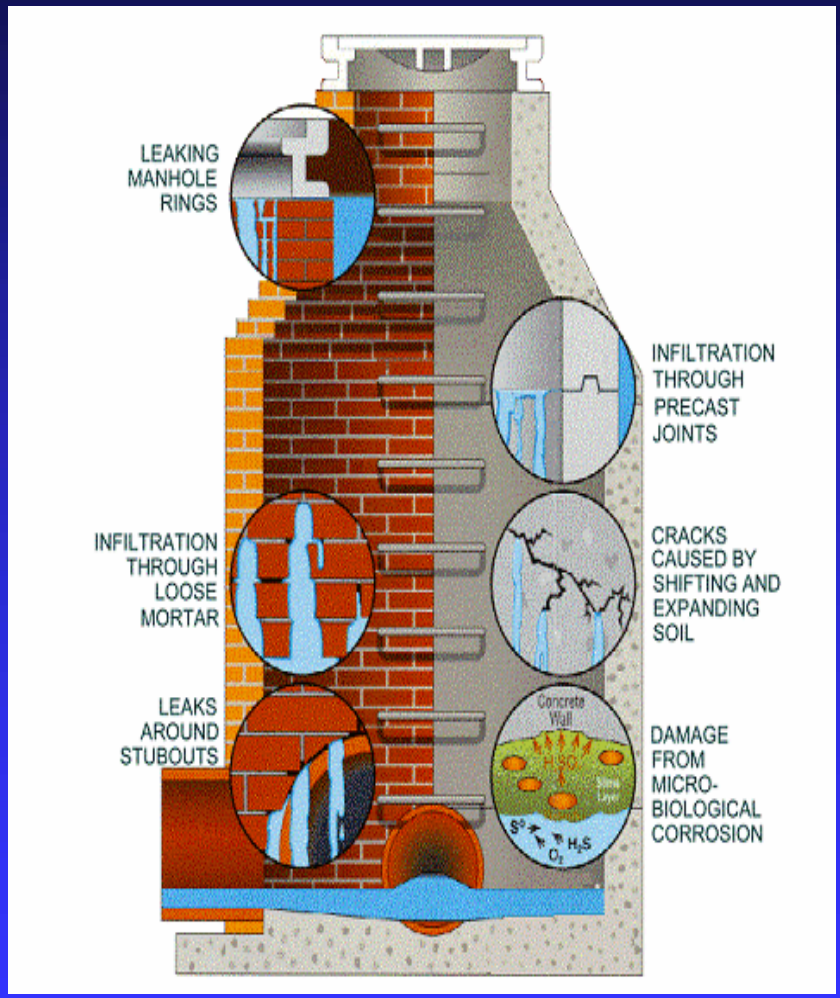
HOUSE TO HOUSE SURVEYS

- USEFUL IN LOCATING IMPROPERLY INSTALLED SUMP PUMPS AND ROOF DRAIN CONNECTIONS
- A PROPERLY INSTALLED SUMP PUMP DIRECTS WATER ONTO THE YARD THROUGH RIGID PIPING



REMEDIATION MEASURES

MANHOLES AND MANHOLE COVERS



REMEDIATION MEASURES

INSTALL MANHOLE INFLOW PROTECTORS

TWO OPTIONS

- INSTALL MANHOLE INFLOW PROTECTOR
- REPLACE DAMAGED OR VENTED MANHOLE COVER

COMPARISON OF POSSIBLE RESOLUTIONS

COST COMPARISON

ALTERNATIVE	COST
INFLOW REMOVAL	$17,500,000*
WASTEWATER TREATMENT PLANT UPGRADE	$300,000,000*

***COSTS WERE DETERMINED FROM PRIOR SSES REPORTS. A PRESENT WORTH EVALUATION WAS COMPLETED TO BRING THE COSTS TO TODAY'S DOLLARS.**

SUMMARY

- REMEDIATING THE JMEUC INFLOW PROBLEM IS VITAL
  - ALLOW FOR FUTURE DEVELOPMENT
  - SAVING MONEY (WWTP UPGRADE AND TREATMENT OF STORM WATER)
  - PRESERVING QUALITY OF WATERWAYS
- INSPECTION AND REMEDIATION METHODS
  - UNCAPPED CLEANOUTS
    - SMOKE TESTING
    - REPLACEMENT OR INSTALLATION OF WATER TIGHT CAP
  - ROOF DRAIN CONNECTIONS
    - SMOKE TESTING, HOUSE TO HOUSE INSPECTIONS
    - REDIRECTION OF ROOF DRAIN
  - STORM CROSS CONNECTIONS
    - SMOKE TESTING
    - ELIMINATION OF CROSS CONNECTION

SUMMARY

- MANHOLES
  - PHYSICAL INSPECTION
  - REPLACEMENT OF PENETRABLE OR DEFICIENT COVERS
- SUMP PUMPS
  - HOUSE TO HOUSE SURVEYS
  - REDIRECTION OF FLOW