

2017 SYSTEM INTEGRITY REPORT

nationalgrid

Enterprise **Gas Distribution Systems** **Trend-Based Integrity Analysis**

NY - MA - RI

**Gas Distribution Engineering
Gas Asset Management– Gas Process & Engineering**

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Overall Regional Gas Distribution Integrity Assessment Summary

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Overall Regional Distribution Integrity Assessment Summary

Distribution Engineering has reviewed all of the findings in the annual Trend-Based Distribution System Integrity Analysis (*System Integrity Report*) in accordance with our Distribution Integrity Management Plan (DIMP), and finds that the leak receipts have declined for two consecutive years for NYS and MA. RI has experienced the lowest amount of leak receipts in the last 10 years which is a testament that the accelerated LPP replacement program is identifying the correct LLP for replacement. There are no immediate causes for concern that would warrant changes to DIMP. Some anomalies were found and either explained as non-systemic or set up for continued research and/or monitoring. These will be explained in notes to this report. CI main break rates have decrease in every region. This is attributed to the mild winter and to the Company's effort to replace LPP and recondition large diameter CI mains.

Below is a summary of the individual key integrity measure results for the eight (8) federal (PHMSA) filing entities that constitute National Grid-US.

2017 System Integrity Report Summary								
REGIONS	KEDNY	KEDLI	NMPC	BGC	EGC	CCC	CLW	RI
ITEMS								
• Leak Receipts	⬇️	⬇️	⬇️	⬆️	⬇️	⬇️	⬆️	⬆️
• Workable Leak Backlog	⬇️	⬇️	⬆️	⬆️	⬇️	—	⬇️	⬆️
• LPP Main and Service Inventories	⬇️	⬇️	⬇️	⬇️	⬇️	⬇️	⬇️	⬇️
• Overall Main Leak Rate	⬇️	⬆️	⬇️	⬆️	⬆️	⬆️	⬆️	⬇️
• Cast Iron Main Break Rate	⬇️	⬇️	⬆️	⬇️	⬇️	No CI	⬆️	⬇️
• Steel Main Corrosion Leak Rate	—	⬇️	—	⬆️	⬇️	⬆️	⬆️	⬆️
• Service Leak Rate	⬆️	⬇️	⬇️	⬆️	⬆️	⬇️	⬆️	⬆️

⬆️ Increase

⬆️ Slight Increase

— No Change

⬇️ Decrease

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LEAK RECEIPTS, REPAIRS AND BACKLOG BY HDD TREND (Main & Service)

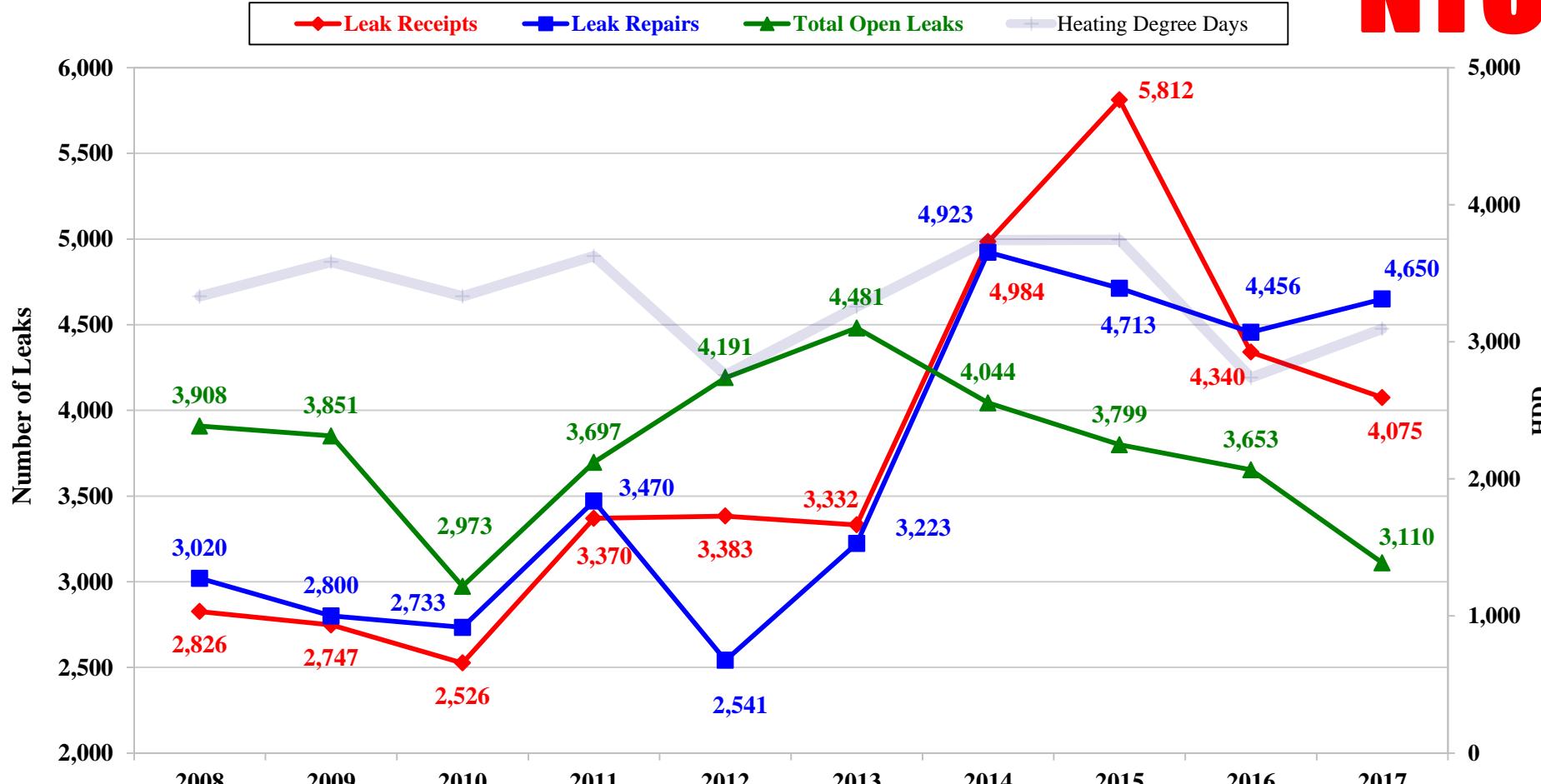
NOTE: Heating Degree Day (HDD)

2017 SYSTEM INTEGRITY REPORT

TOTAL LEAK RECEIPTS, REPAIRS & BACKLOG

INCLUDES ALL TYPE 1, 2A, 2 and 3 LEAKS DISCOVERED - EXCLUDING DAMAGES

NYC



Leak Receipts and Repairs and Backlog:

2017 NYC Leak Repairs =

2017 NYC Leak Receipts =

2017 NYC Leak Backlogs =

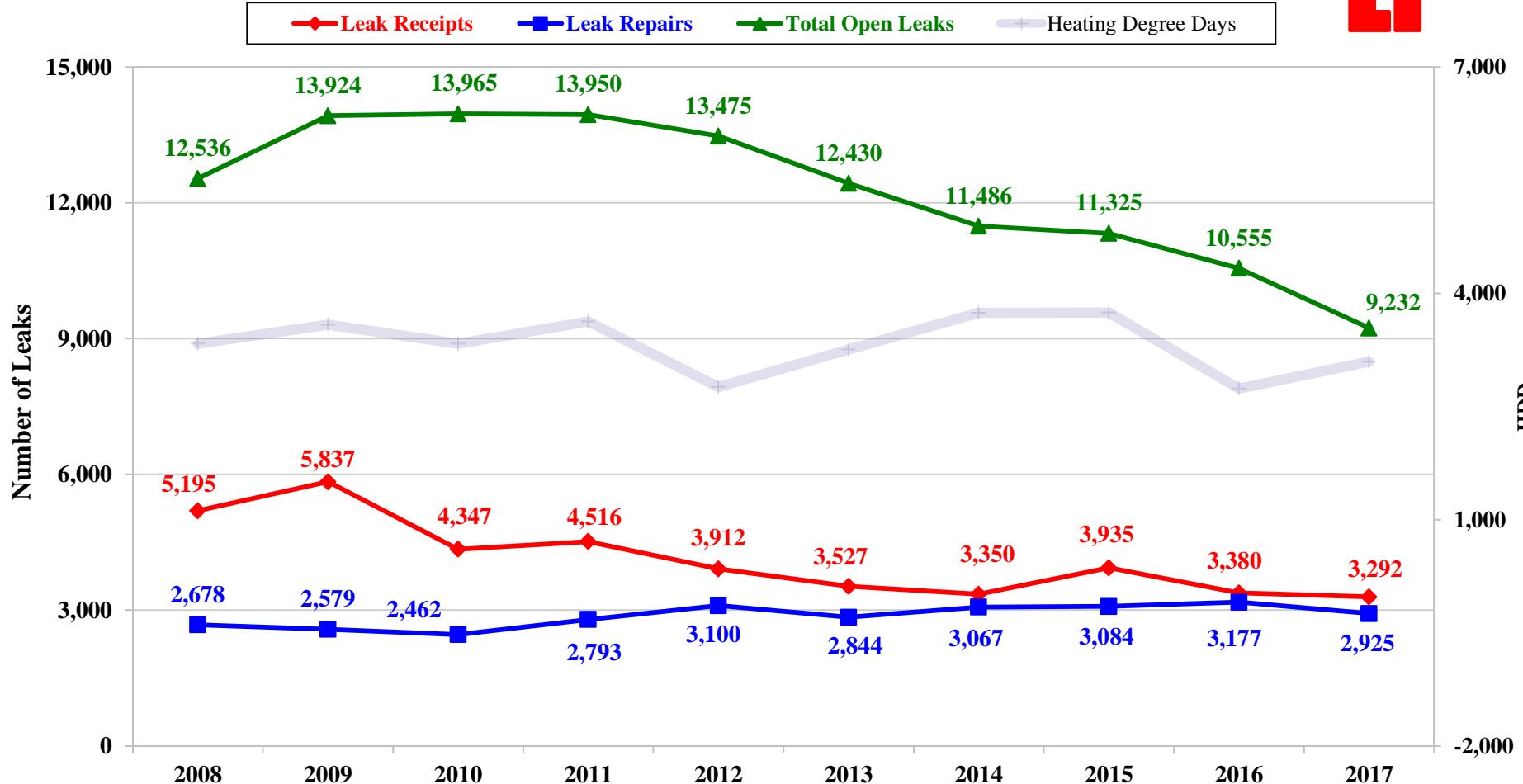
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2017 SYSTEM INTEGRITY REPORT

TOTAL LEAK RECEIPTS, REPAIRS & BACKLOG

INCLUDES ALL TYPE 1, 2A, 2 and 3 LEAKS DISCOVERED - EXCLUDING DAMAGES

LI



Leak Receipts and Repairs and Backlog:

2017 LI Leak Repairs =



2017 LI Leak Receipts =



2017 LI Leak Backlogs =



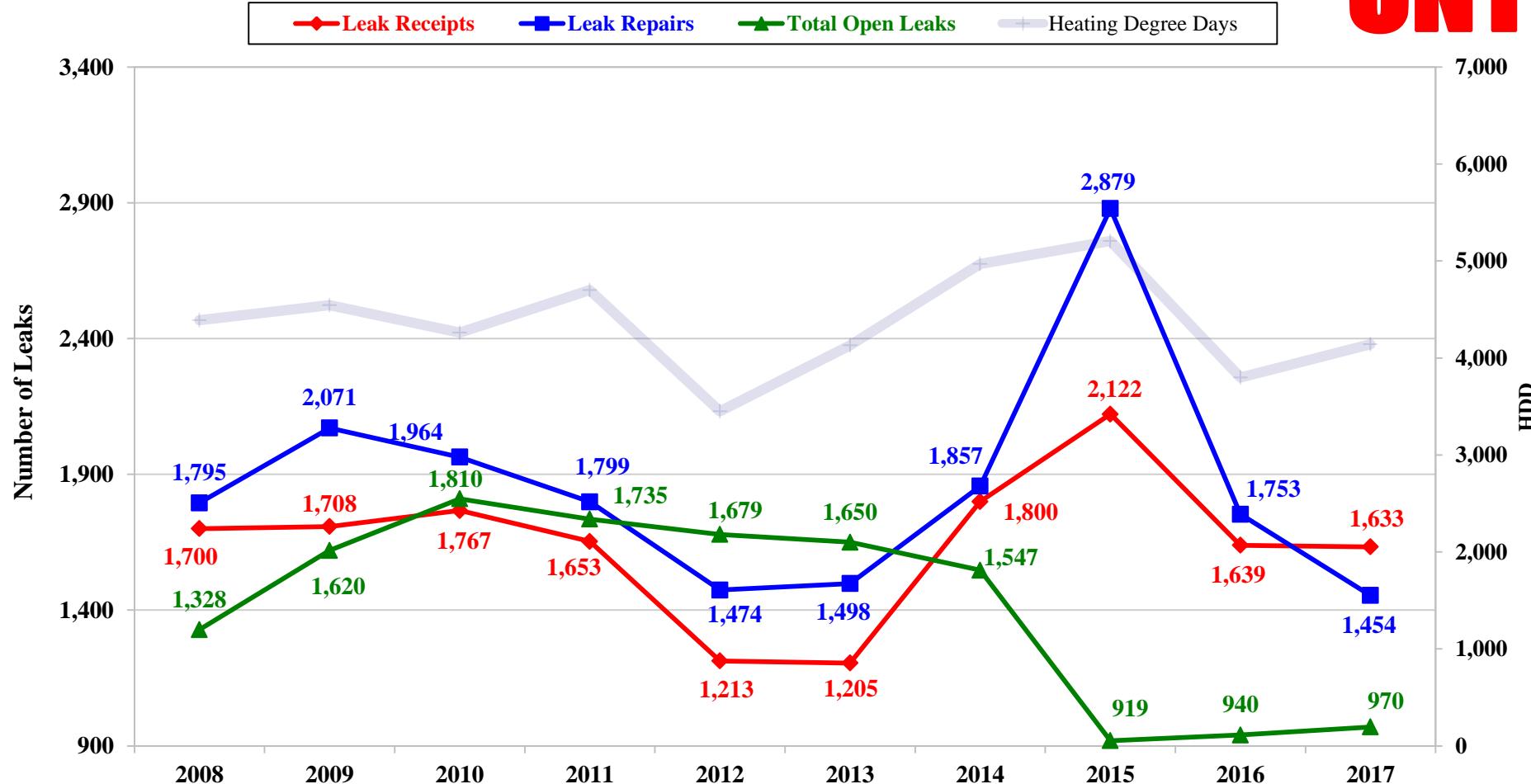
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2017 SYSTEM INTEGRITY REPORT

TOTAL LEAK RECEIPTS, REPAIRS & BACKLOG

INCLUDES ALL TYPE 1, 2A, 2 and 3 LEAKS DISCOVERED - EXCLUDING DAMAGES

UNY



Leak Receipts and Repairs and Backlog :

2017 UNY Leak Repairs =

2017 UNY Leak Receipts =

2017 UNY Leak Backlogs =

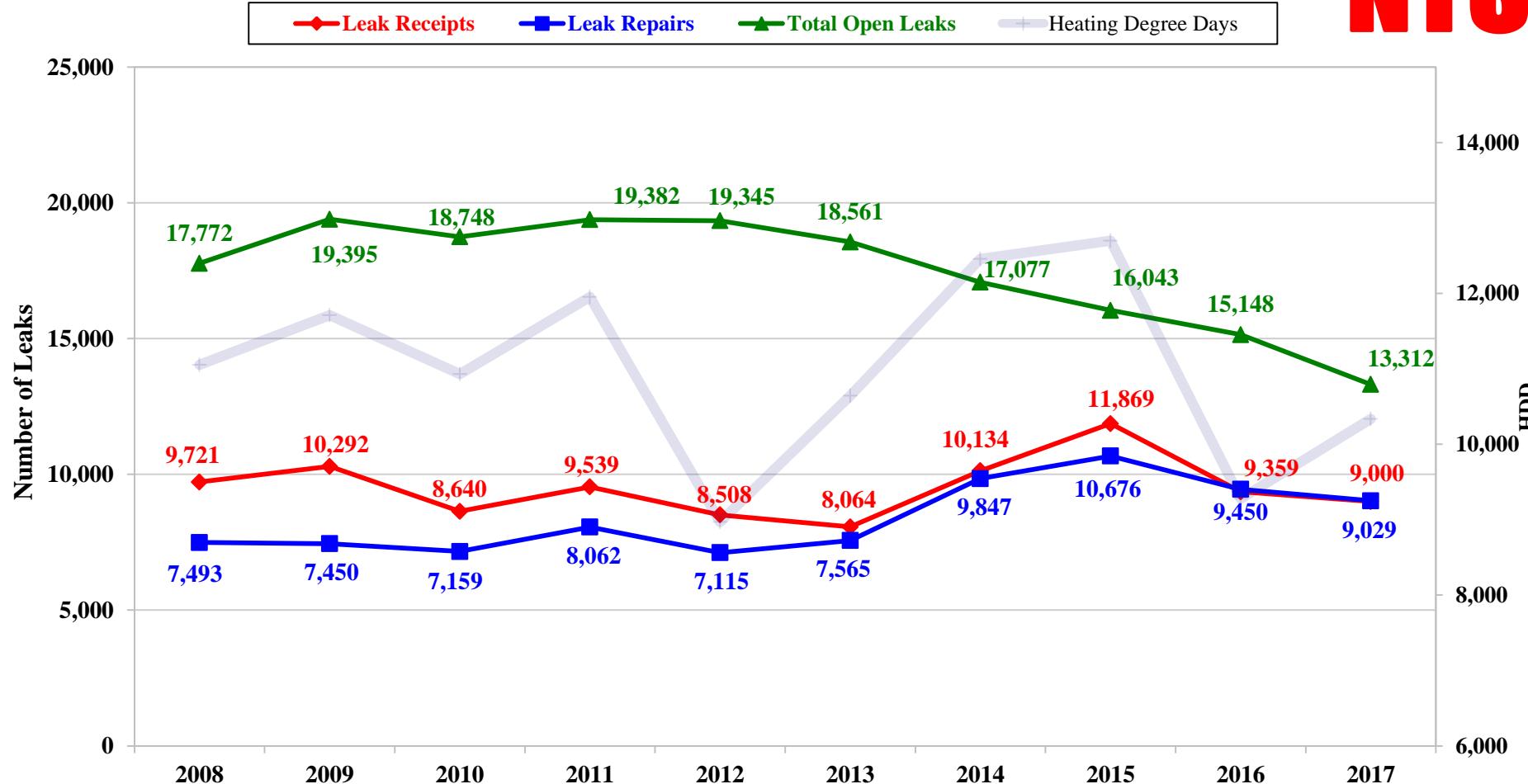
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2017 SYSTEM INTEGRITY REPORT

TOTAL LEAK RECEIPTS, REPAIRS & BACKLOG

INCLUDES ALL TYPE 1, 2A, 2 and 3 LEAKS DISCOVERED - EXCLUDING DAMAGES

NYS



Leak Receipts and Repairs and Backlog:

2017 NYC Leak Repairs =

2017 NYC Leak Receipts =

2017 NYC Leak Backlogs =

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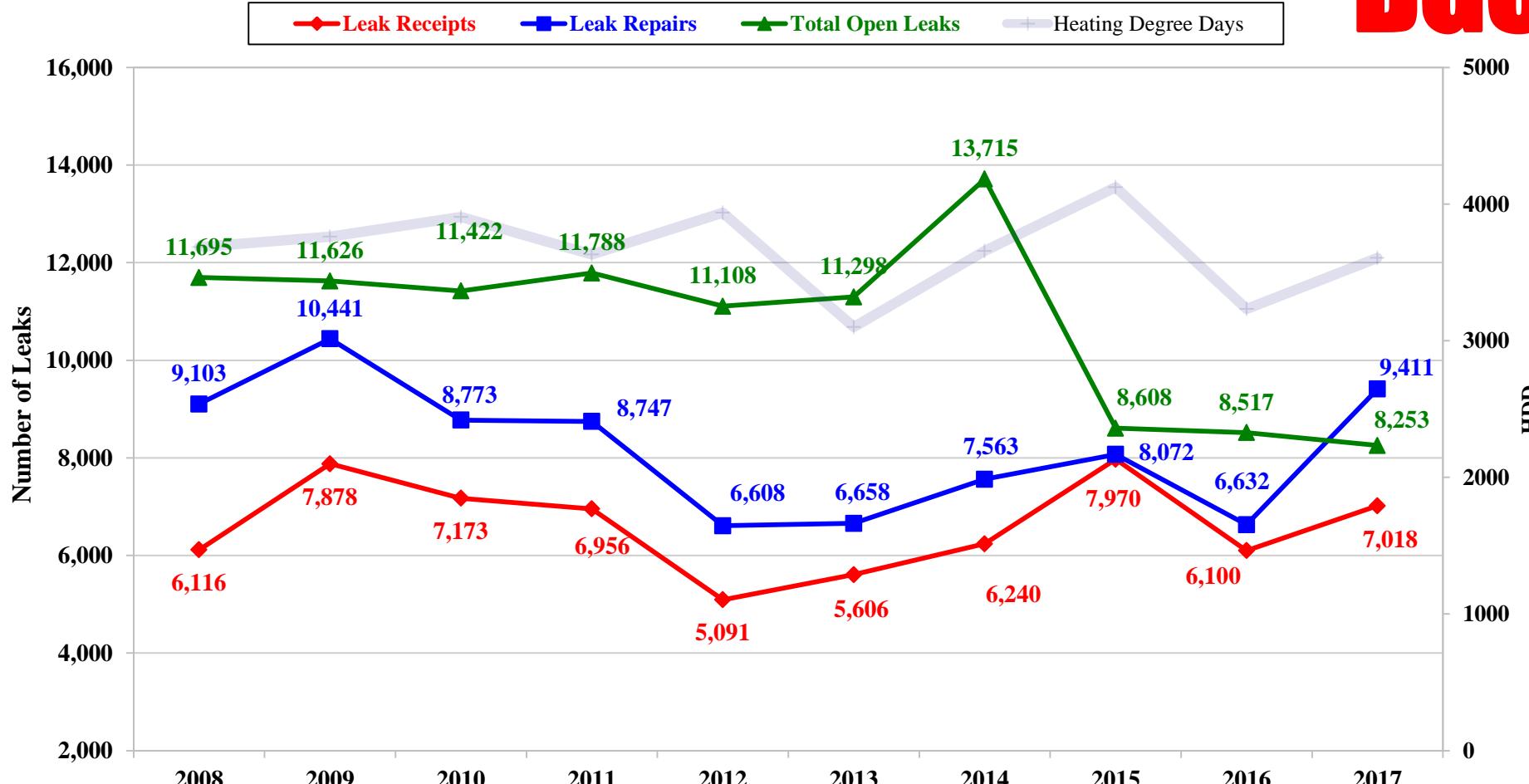
10

2017 SYSTEM INTEGRITY REPORT

TOTAL LEAK RECEIPTS, REPAIRS & BACKLOG

INCLUDES ALL TYPE 1, 2A, 2 and 3 LEAKS DISCOVERED - EXCLUDING DAMAGES

BGC



Leak Receipts and Repairs and Backlog:

2017 BGC Leak Repairs =

2017 BGC Leak Receipts =

2017 BGC Leak Backlogs =

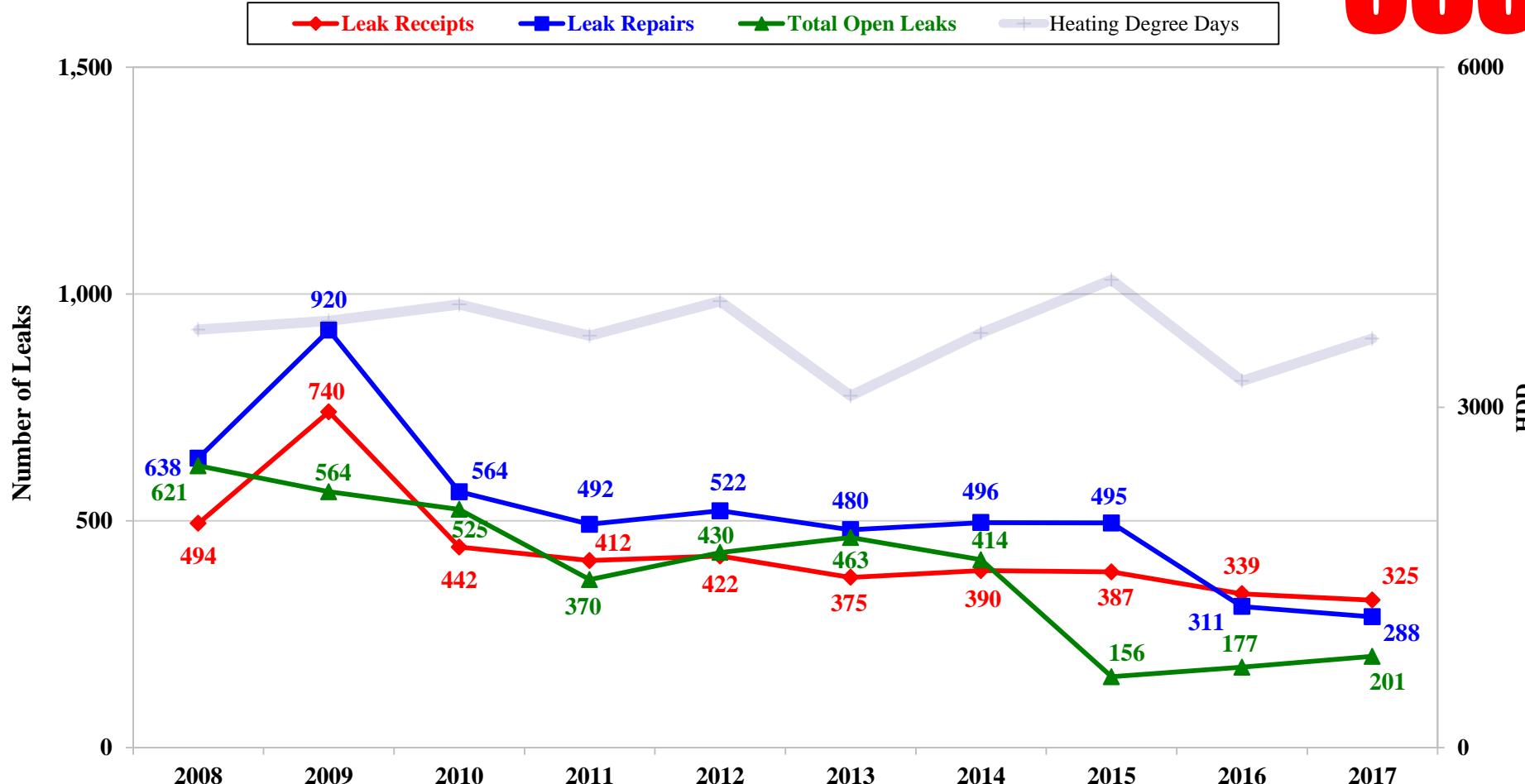
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TOTAL LEAK RECEIPTS, REPAIRS & BACKLOG

INCLUDES ALL TYPE 1, 2A, 2 and 3 LEAKS DISCOVERED - EXCLUDING DAMAGES

CCC



Leak Receipts and Repairs and Backlog:

2017 CCC Leak Repairs =

2017 CCC Leak Receipts =

2017 CCC Leak Backlogs =

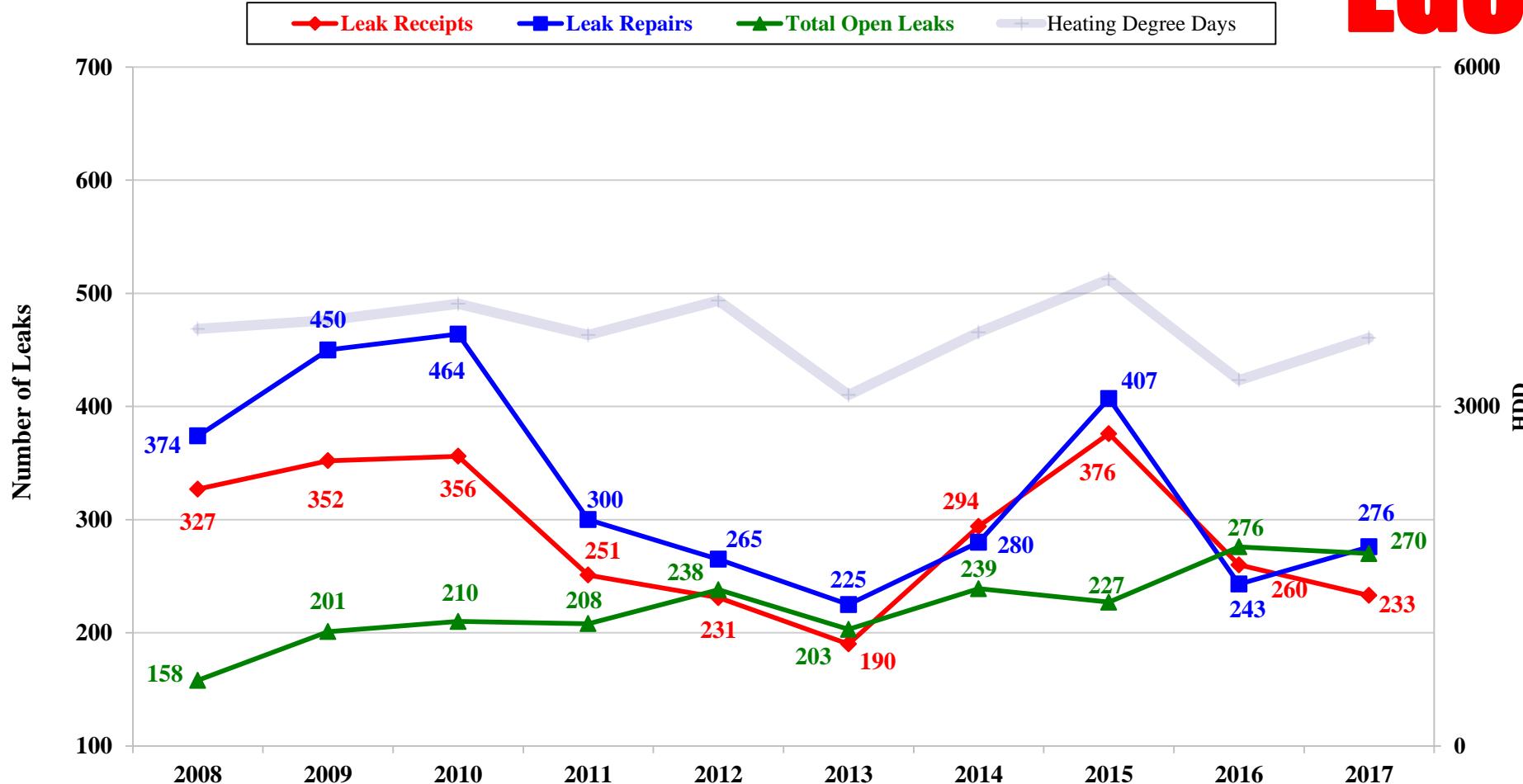
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TOTAL LEAK RECEIPTS, REPAIRS & BACKLOG

INCLUDES ALL TYPE 1, 2A, 2 and 3 LEAKS DISCOVERED - EXCLUDING DAMAGES

EGC



Leak Receipts and Repairs and Backlog:

2017 EGC Leak Repairs =

2017 EGC Leak Receipts =

2017 EGC Leak Backlogs =

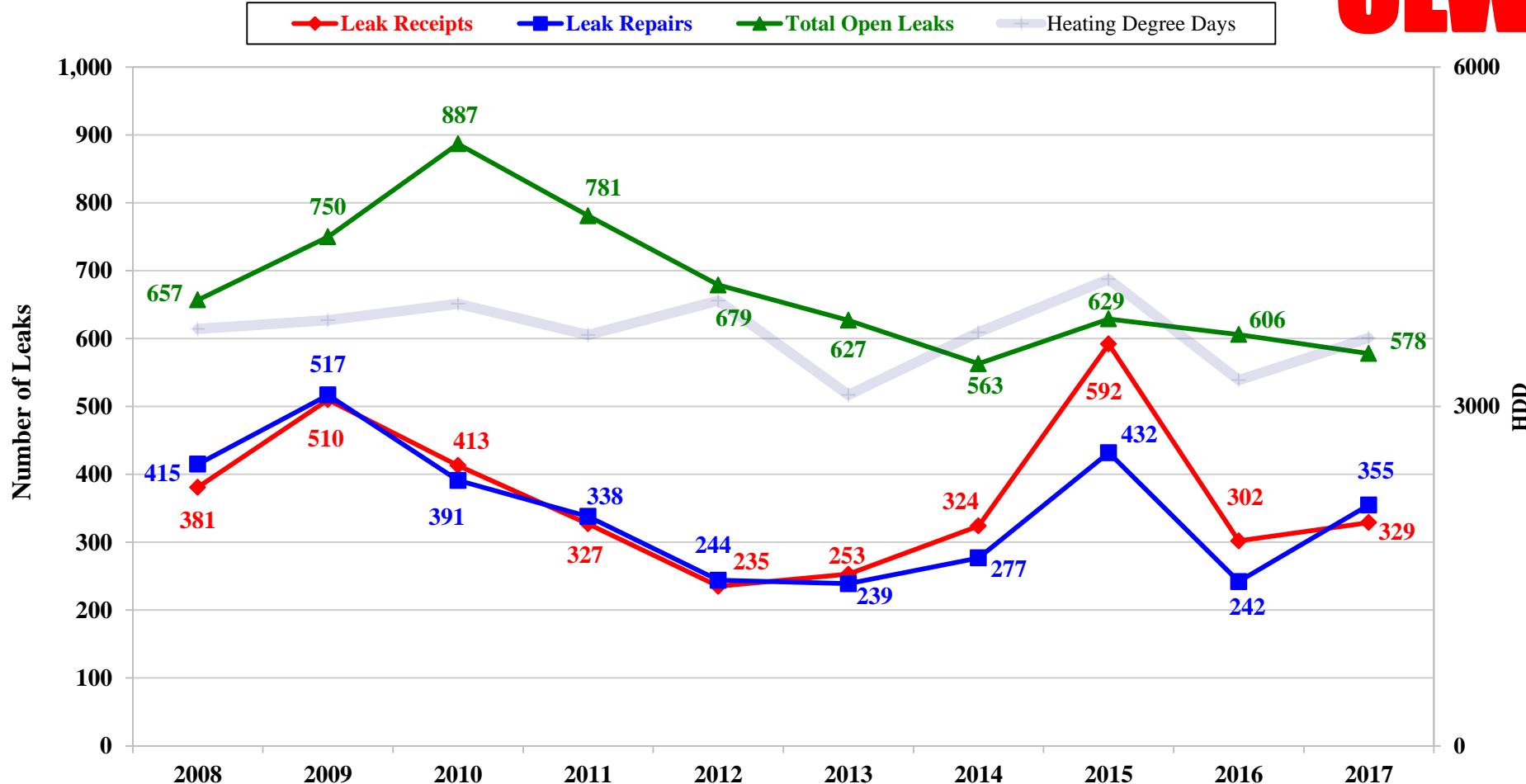
nationalgrid

2017 SYSTEM INTEGRITY REPORT

TOTAL LEAK RECEIPTS, REPAIRS & BACKLOG

INCLUDES ALL TYPE 1, 2A, 2 and 3 LEAKS DISCOVERED - EXCLUDING DAMAGES

CLW



Leak Receipts and Repairs and Backlog:

2017 CLW Leak Repairs =

2017 CLW Leak Receipts =

2017 CLW Leak Backlogs =

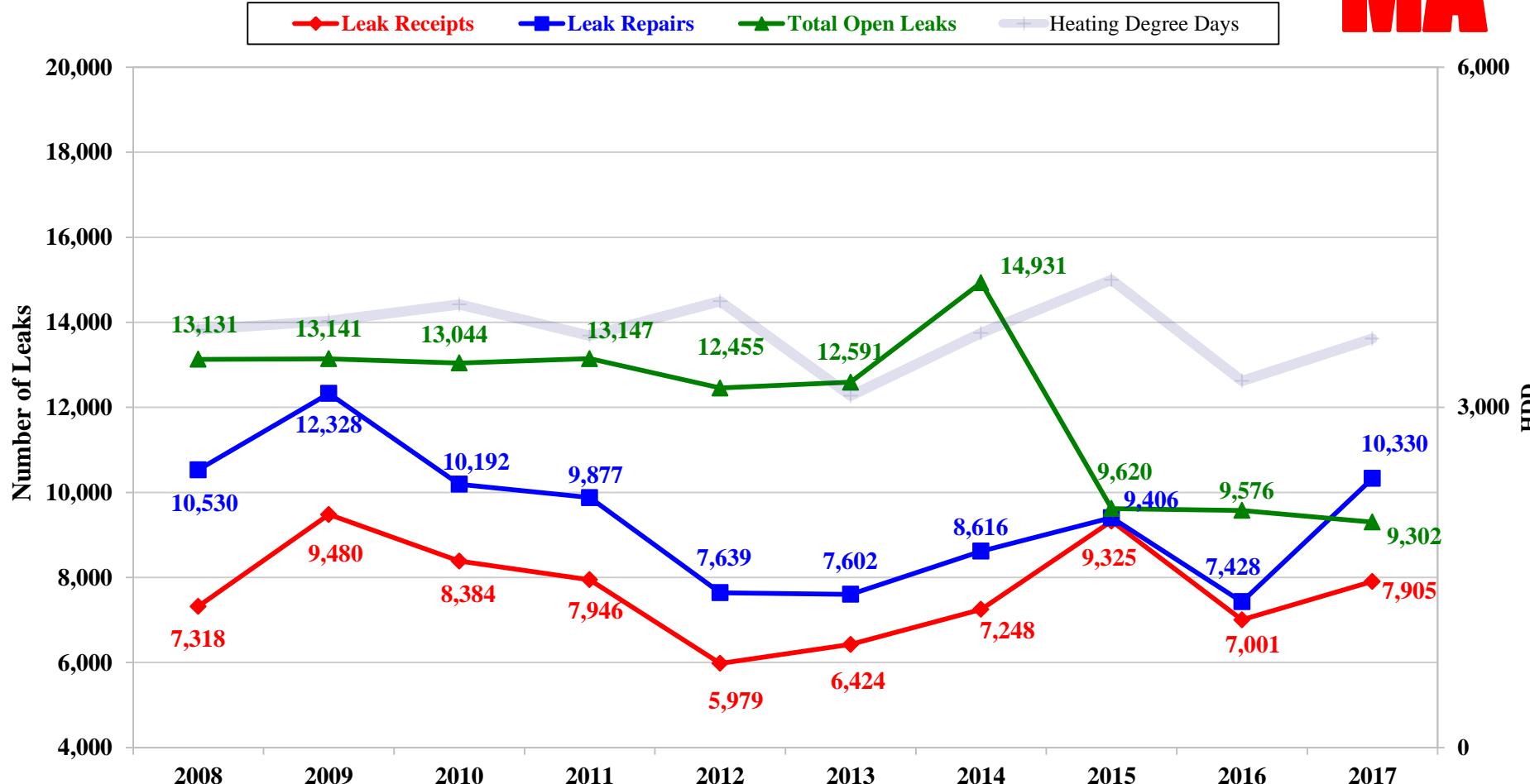
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2017 SYSTEM INTEGRITY REPORT

TOTAL LEAK RECEIPTS, REPAIRS & BACKLOG

MA

INCLUDES ALL TYPE 1, 2A, 2 and 3 LEAKS DISCOVERED - EXCLUDING DAMAGES



Leak Receipts and Repairs and Backlog:

2017 MA Leak Repairs =

2017 MA Leak Receipts =

2017 MA Leak Backlogs =

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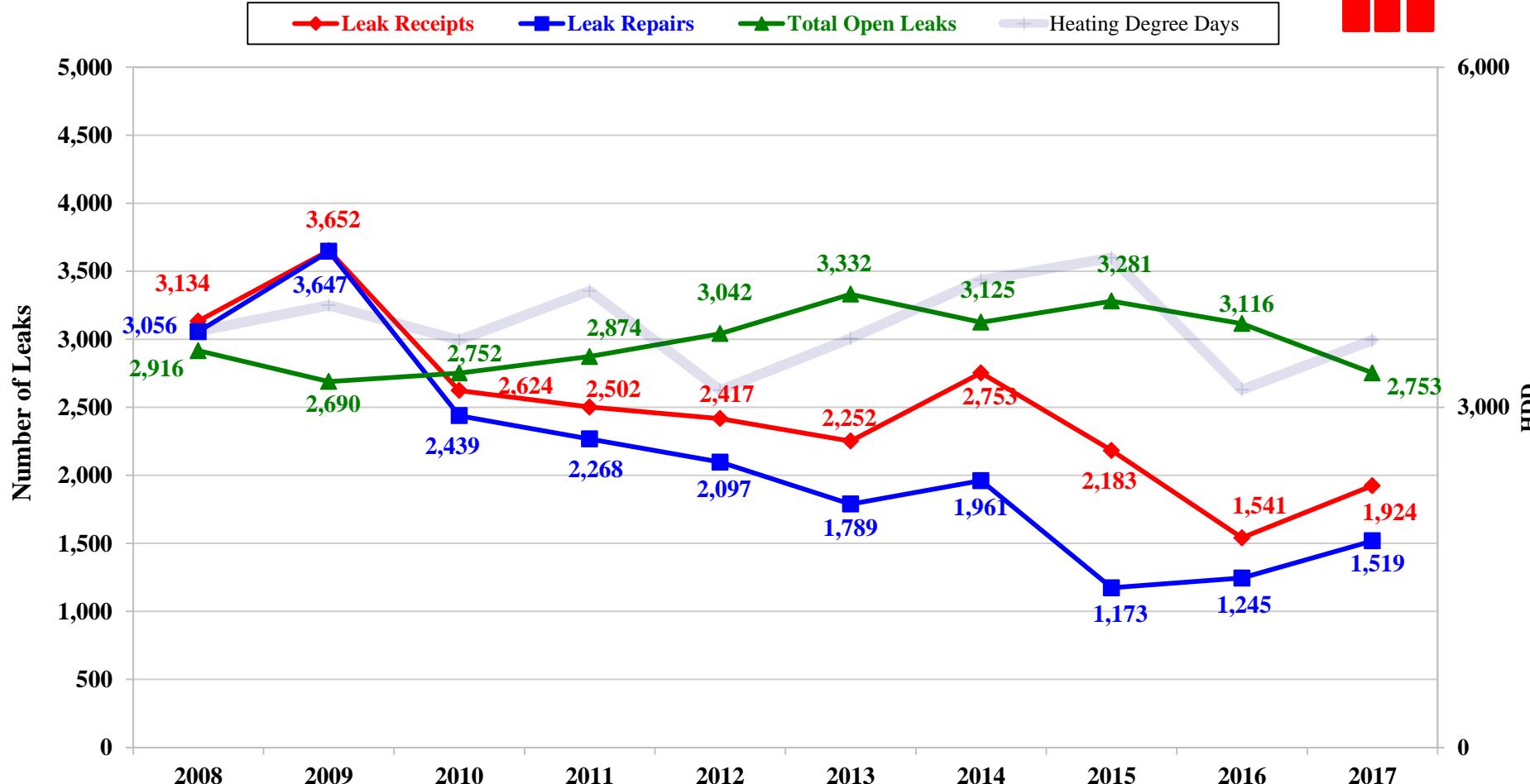
15

2017 SYSTEM INTEGRITY REPORT

TOTAL LEAK RECEIPTS, REPAIRS & BACKLOG

INCLUDES ALL TYPE 1, 2A, 2 and 3 LEAKS DISCOVERED - EXCLUDING DAMAGES

RI



Leak Receipts and Repairs and Backlog:

2017 RI Leak Repairs =



2017 RI Leak Receipts =



2017 RI Leak Backlogs =



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2017 SYSTEM INTEGRITY REPORT

Overall Regional Distribution Integrity Assessment Summary

New York City (KEDNY)

- Leak receipts decreased.
- Workable leak backlog decreased.
- Leak prone main and service inventories continue to decline steadily.
- Overall main leak rate increased, whereas steel main corrosion leak remained steady and Cast Iron Main break rate is decreased
- Service leak rate increased slightly .

Long Island (KEDLI)

- Leak receipts decreased.
- Workable leak backlog decreased.
- Leak prone main and service inventories continue to decline steadily.
- Overall main leak rate increased slightly. Steel main corrosion leak rate decreased and Cast iron main break rate increased.
- Service leak rate decreased.

Upstate NY (NMPC)

- Leak receipts decreased.
- Workable leak backlog slightly increased.
- Leak prone main and service inventories continue to decline steadily.
- Overall main leak rate deceased. Steel main corrosion leak remained steady and Cast iron main break rate slightly increased.
- Service leak rate decreased.

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Overall Regional Distribution Integrity Assessment Summary

Boston (BGC)

- Leak receipts increased.
- Workable leak backlog slightly increased.
- Leak prone main inventories continue to decline steadily.
- Overall main leak rate decreased. Steel main corrosion leak rate slight increased. Cast iron main break rate decreased.
- Service leak rate increased slightly.

Essex (EGC)

- Leak receipts decreased.
- Workable leak backlog decreased.
- Leak prone main and service inventories continue to decline steadily.
- Overall main leak rate decreased. Steel main corrosion leak rate and Cast iron main break rate both decreased.
- Service leak rate increased slightly.

Colonial – Cape Cod (CCC)

- Leak receipts decreased.
- Workable leak backlog remained the same.
- Leak prone main and service inventories continue to decline steadily.
- Overall main leak rate increased slightly. Steel main corrosion leak rate decreased.
- Service leak rate decreased.

2017 SYSTEM INTEGRITY REPORT

Overall Regional Distribution Integrity Assessment Summary

Colonial – Lowell (CLW)

- Leak receipts increased slightly.
- Workable leak backlog decreased.
- Leak prone main and service inventories decreased.
- Overall main leak rate increased slightly. Steel main corrosion leak rate and Cast iron main break rate both increased slightly.
- Service leak rate increased slightly.

Rhode Island (RI)

- Leak receipts increased.
- Workable leak backlog increased.
- Leak prone main and service inventories continue to decline steadily.
- Overall main leak rate, Cast iron main break rate, and Steel main corrosion rate decreased.
- Service leak rate increased.

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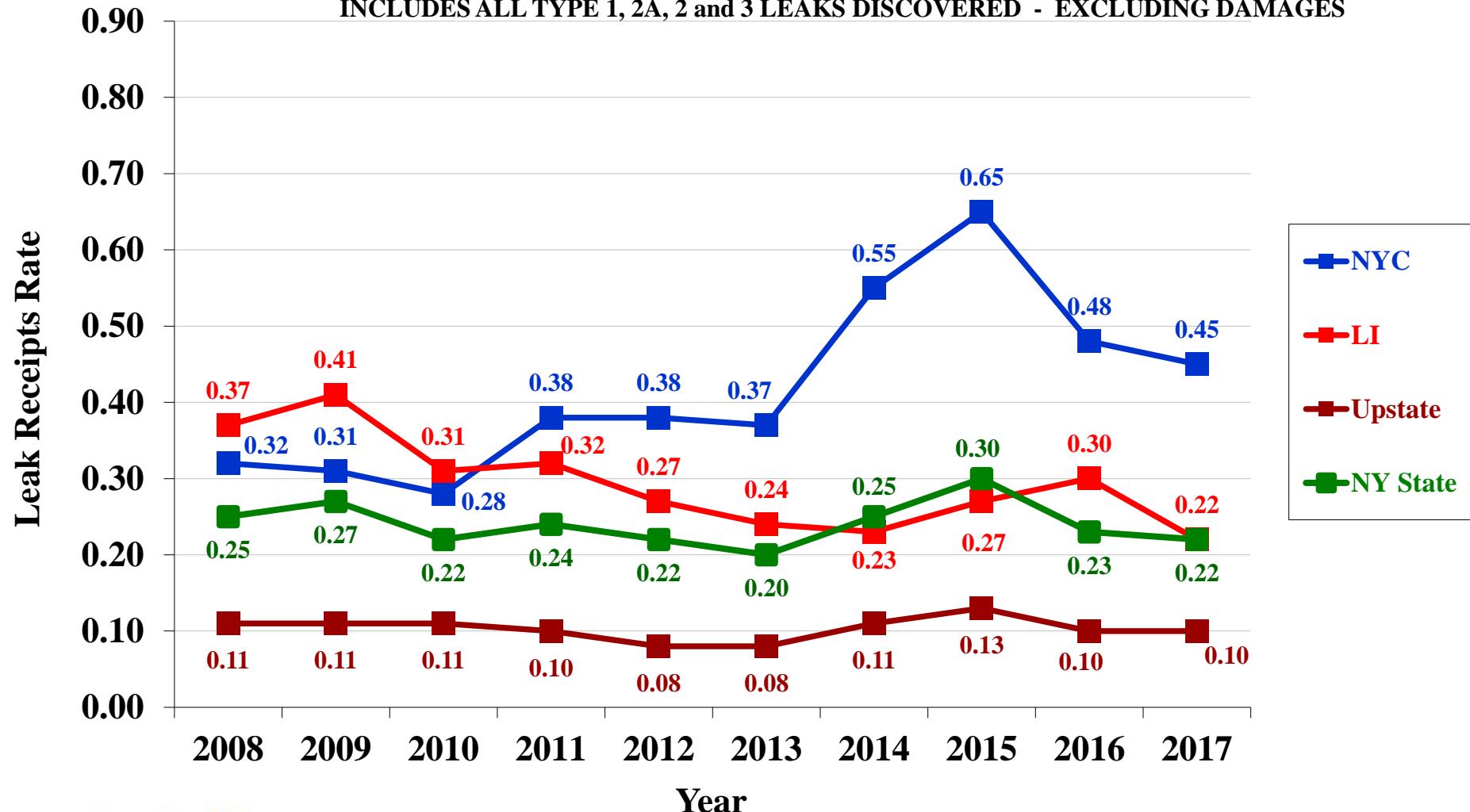
LEAK MANAGEMENT ANALYSIS (Mains & Services)

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NYS

TOTAL LEAK RECEIPTS RATE

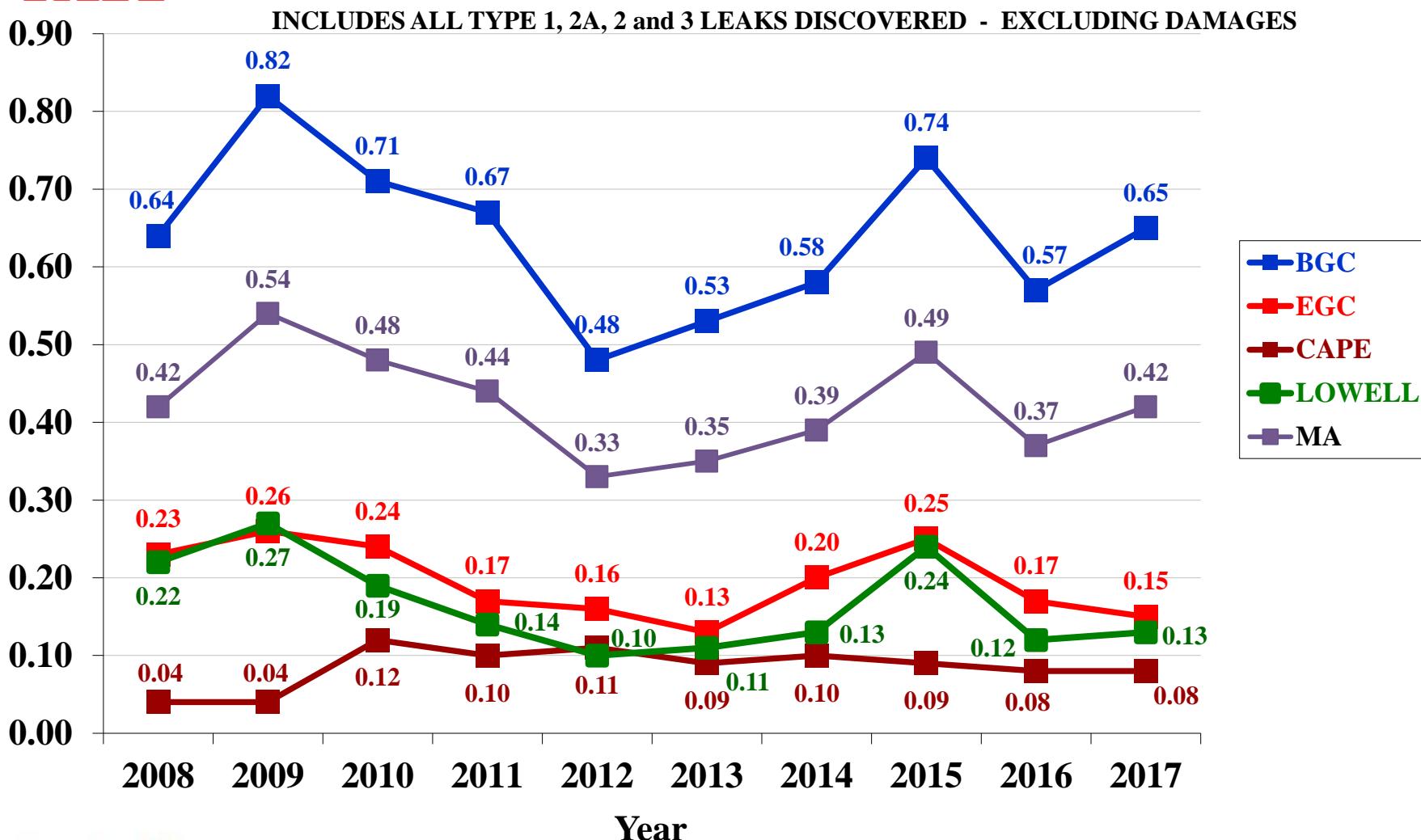
INCLUDES ALL TYPE 1, 2A, 2 and 3 LEAKS DISCOVERED - EXCLUDING DAMAGES



2017 SYSTEM INTEGRITY REPORT

MA

TOTAL LEAK RECEIPTS RATE

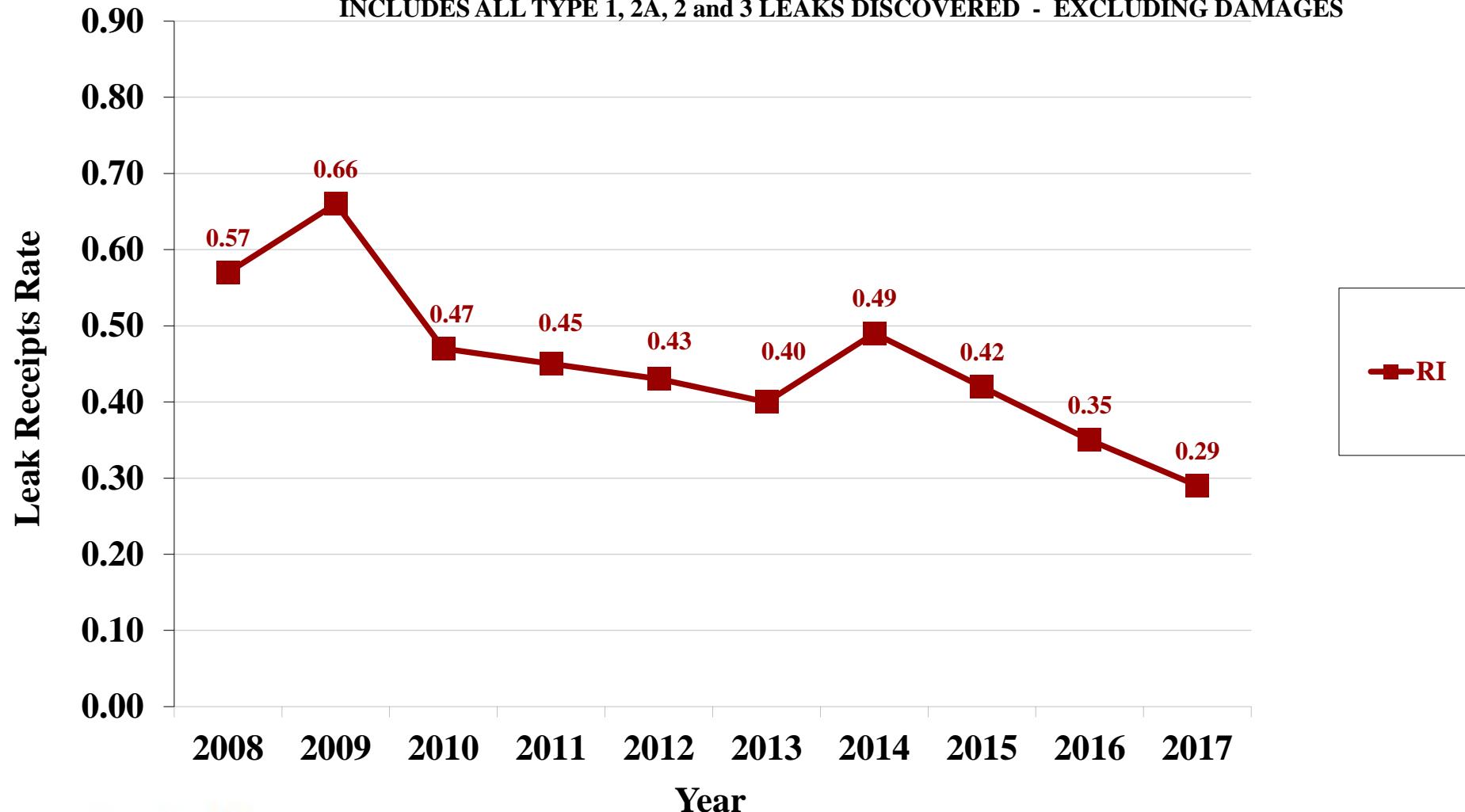


2017 SYSTEM INTEGRITY REPORT

RI

TOTAL LEAK RECEIPTS RATE

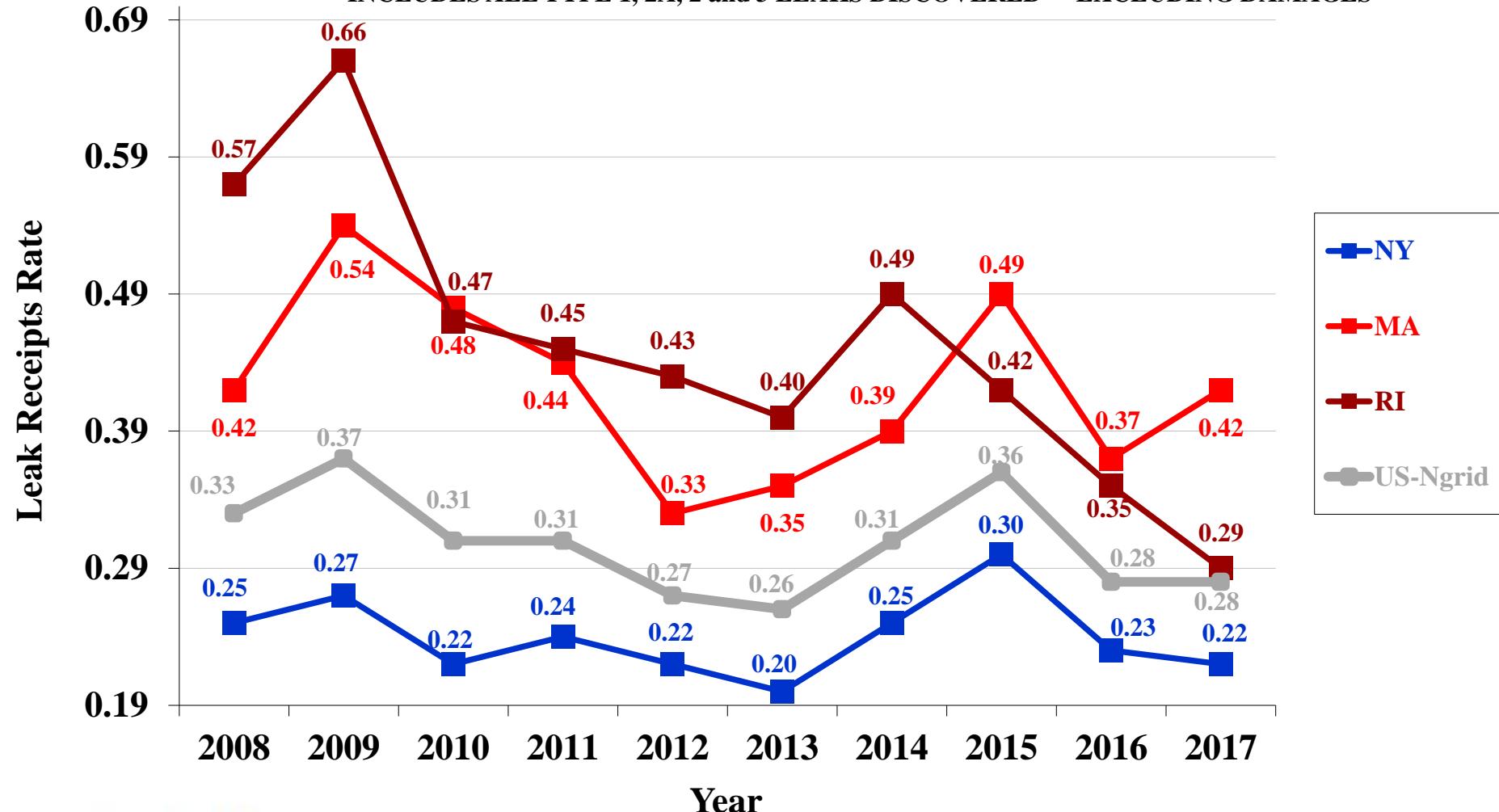
INCLUDES ALL TYPE 1, 2A, 2 and 3 LEAKS DISCOVERED - EXCLUDING DAMAGES



2017 SYSTEM INTEGRITY REPORT

TOTAL LEAK RECEIPTS RATE

INCLUDES ALL TYPE 1, 2A, 2 and 3 LEAKS DISCOVERED - EXCLUDING DAMAGES

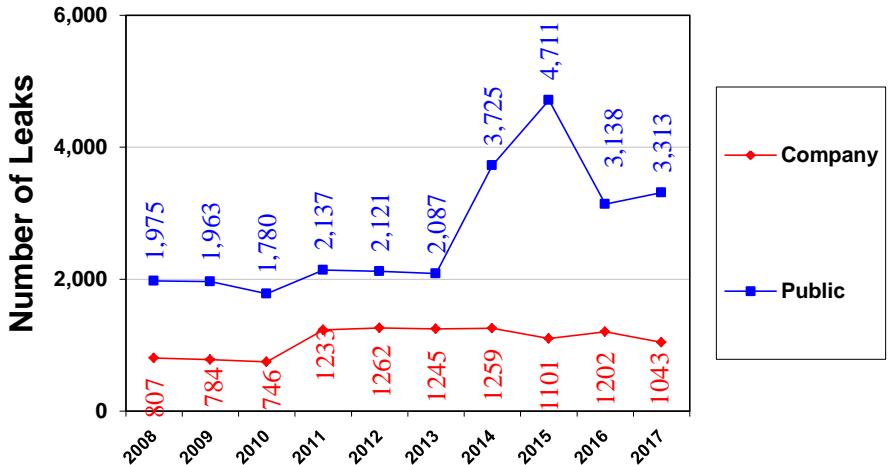


2017 SYSTEM INTEGRITY REPORT

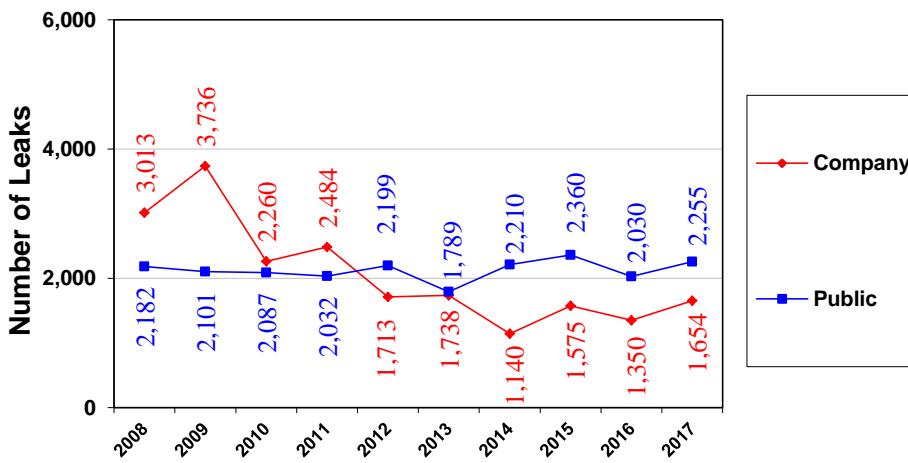
2008 - 2017 LEAK RECEIPTS

By Discovery Source (Excluding Damages)

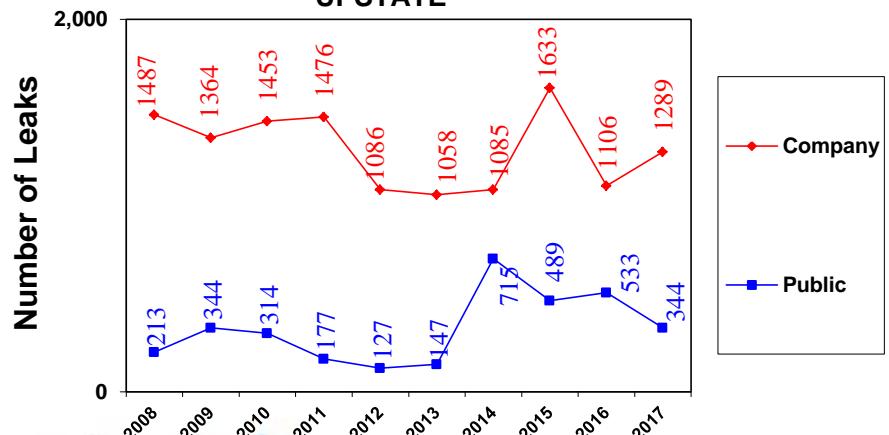
NEW YORK CITY



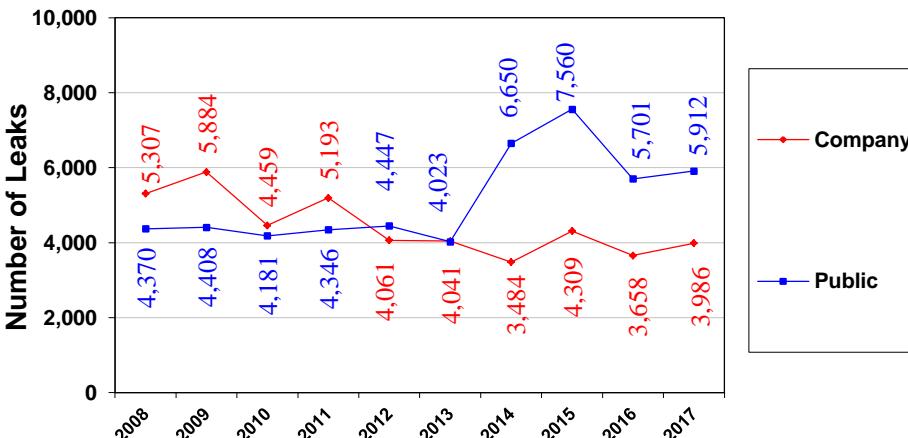
LONG ISLAND



UPSTATE



NEW YORK STATE

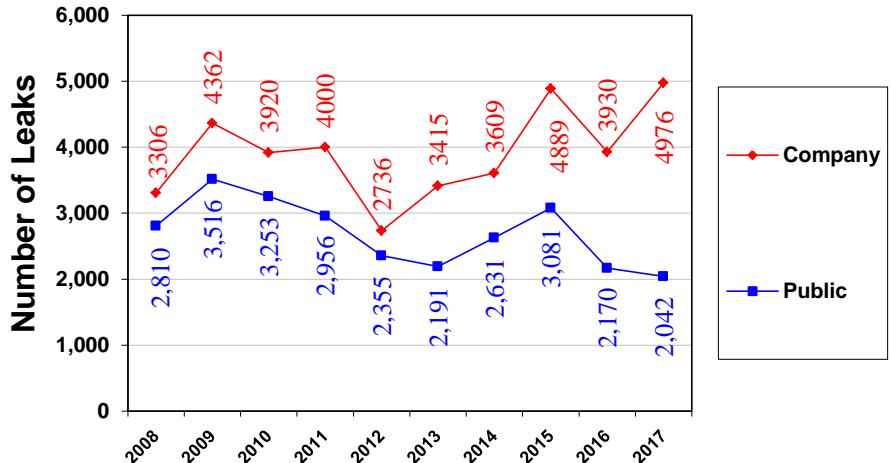


2017 SYSTEM INTEGRITY REPORT

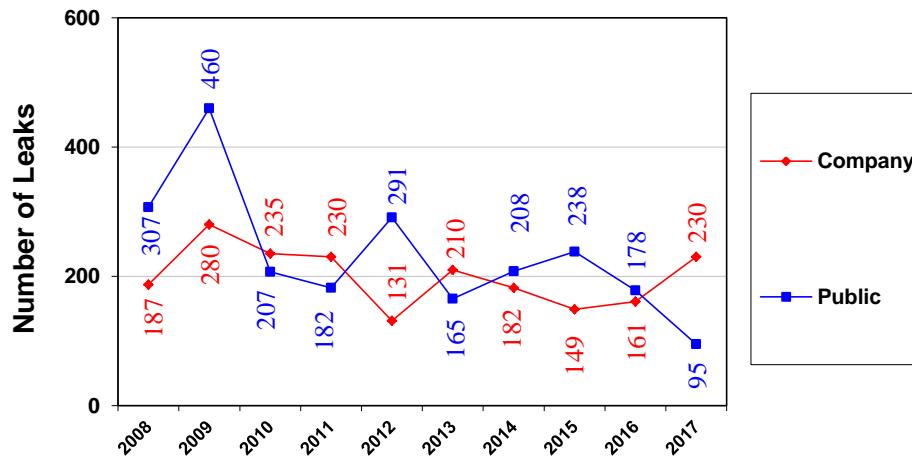
2008 - 2017 LEAK RECEIPTS

By Discovery Source (Excluding damages)

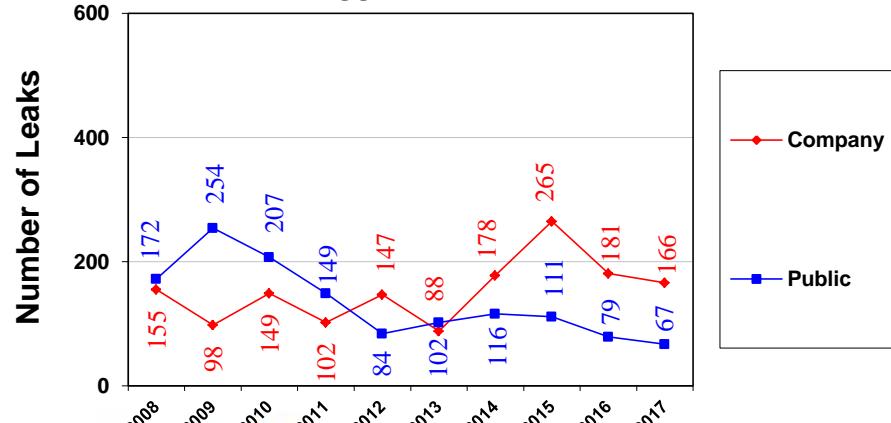
BOSTON



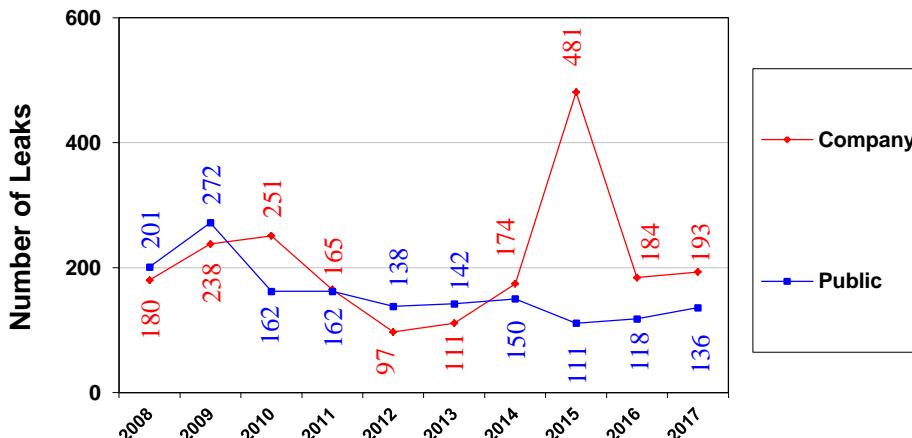
CAPE COD



ESSEX



LOWELL

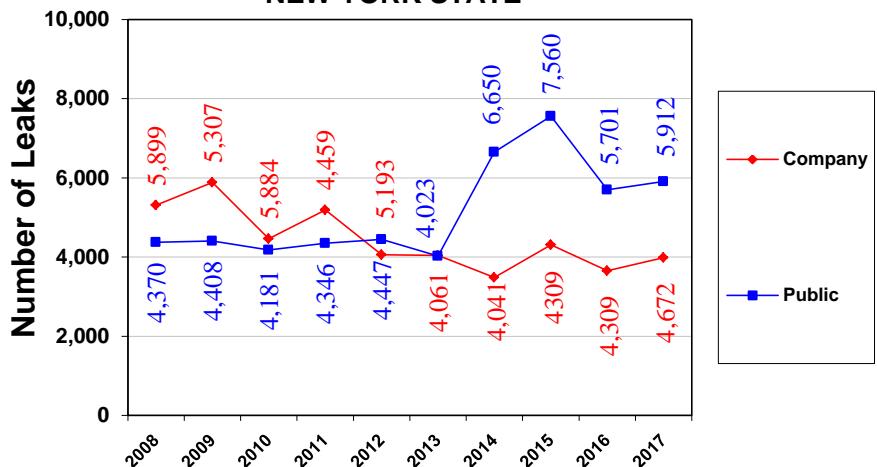


2017 SYSTEM INTEGRITY REPORT

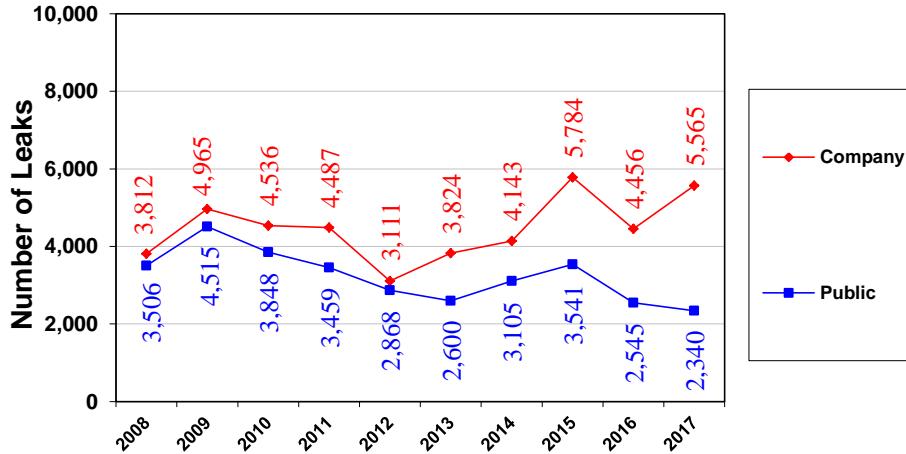
2007 - 2017 LEAK RECEIPTS

By Discovery Source (Excluding damages)

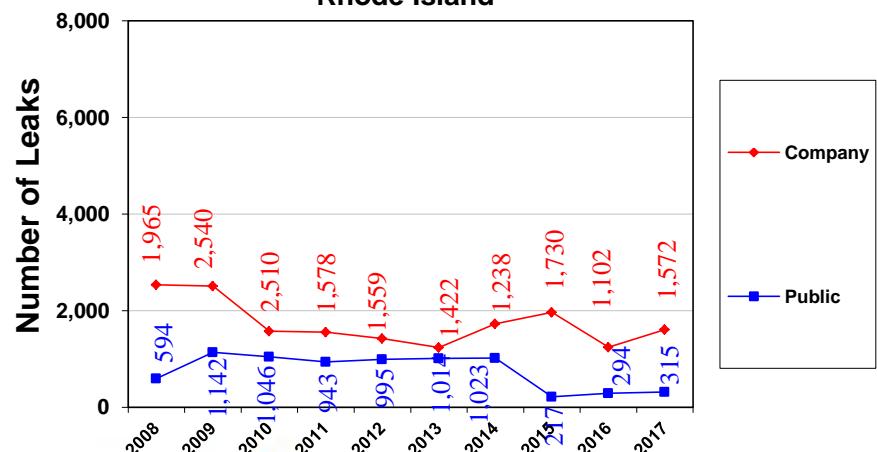
NEW YORK STATE



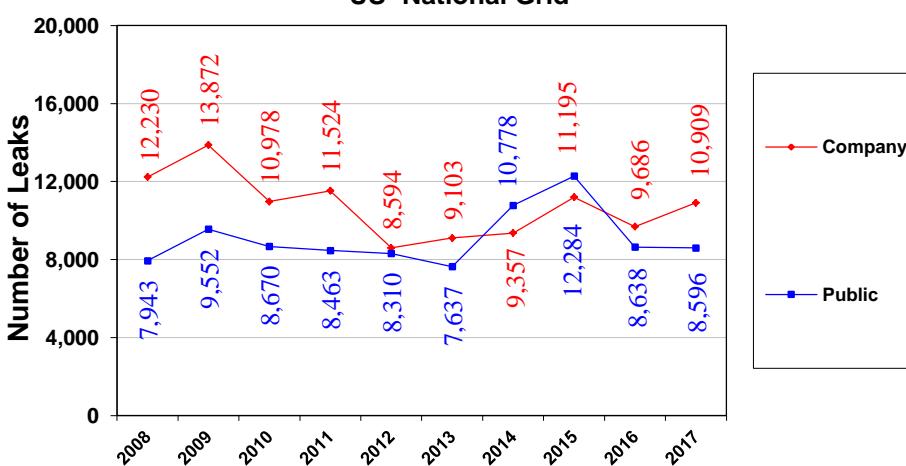
MASSACHUSETTS



Rhode Island



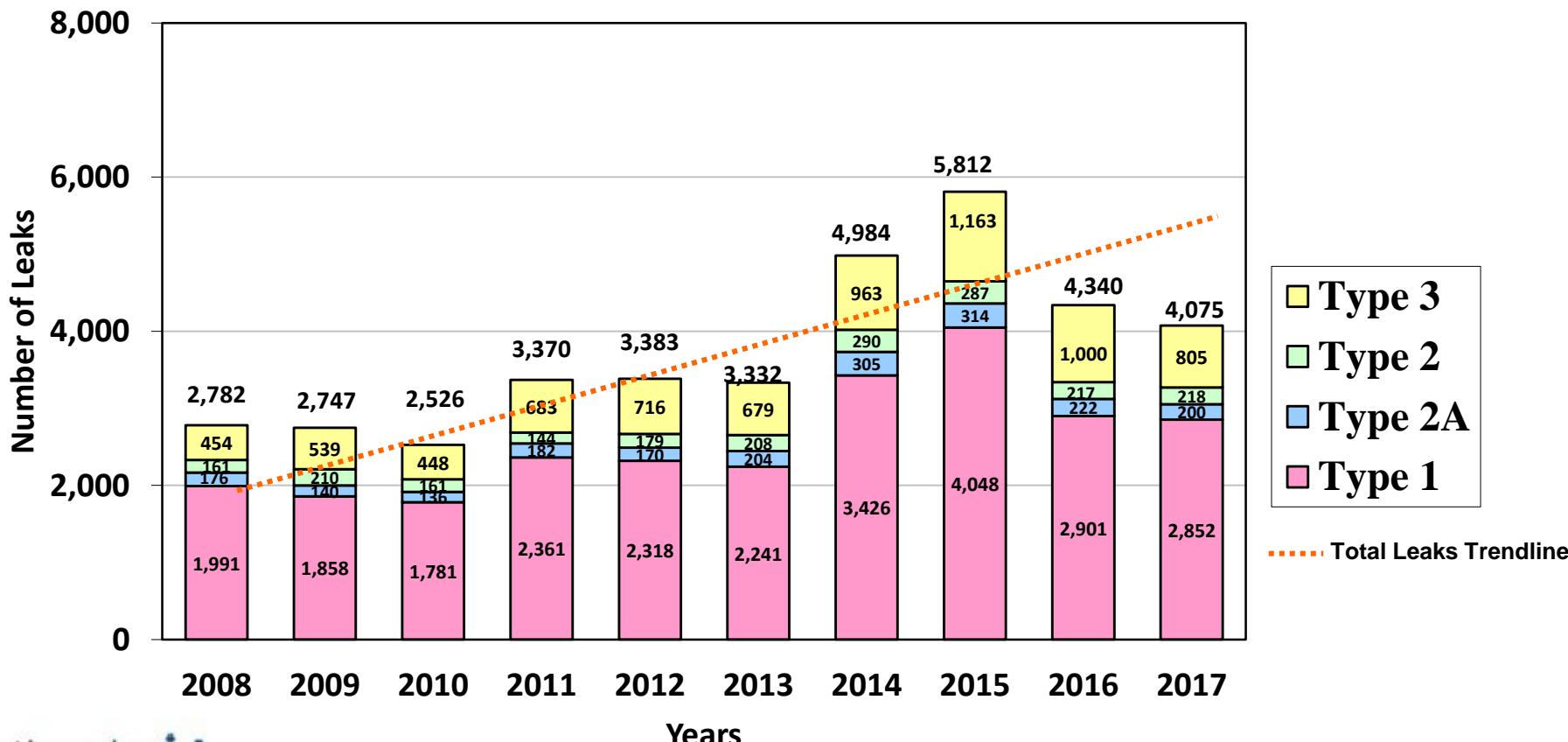
US- National Grid



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NYC

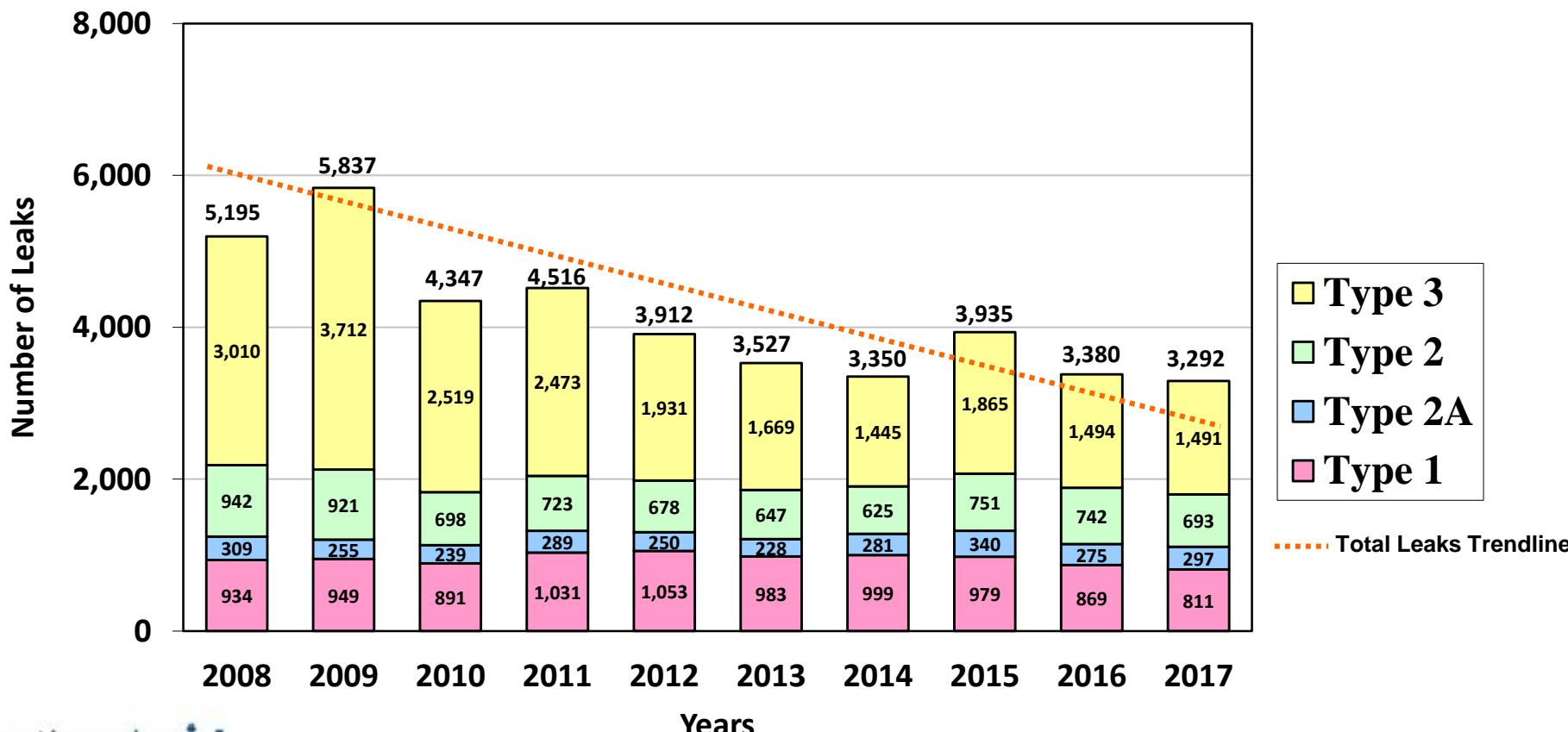
LEAK RECEIPTS By ORIGINAL Type (Excluding Damages)



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LEAK RECEIPTS By ORIGINAL Type (Excluding Damages)

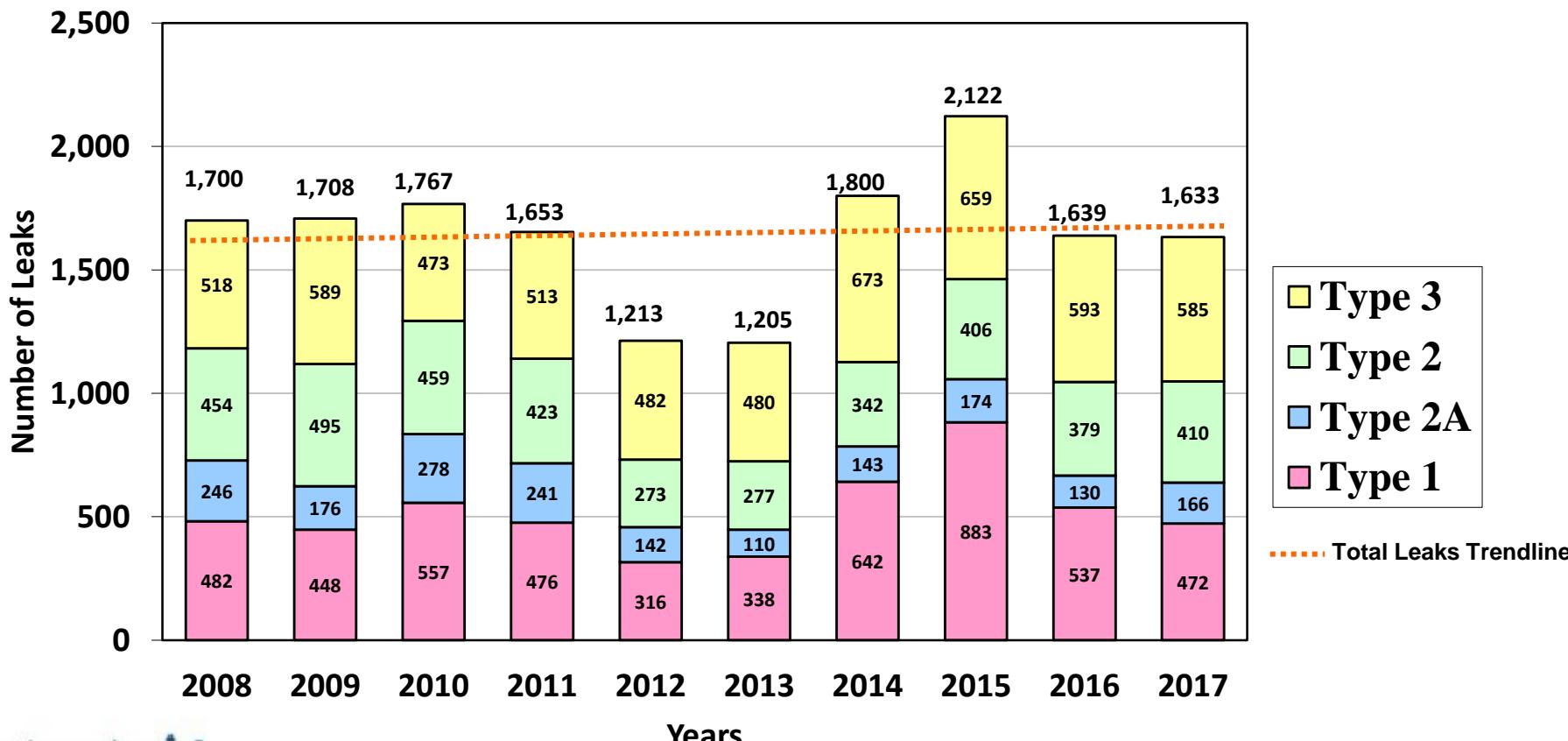


2017 SYSTEM INTEGRITY REPORT

UPSTATE

LEAK RECEIPTS By ORIGINAL Type

(Excluding Damages)

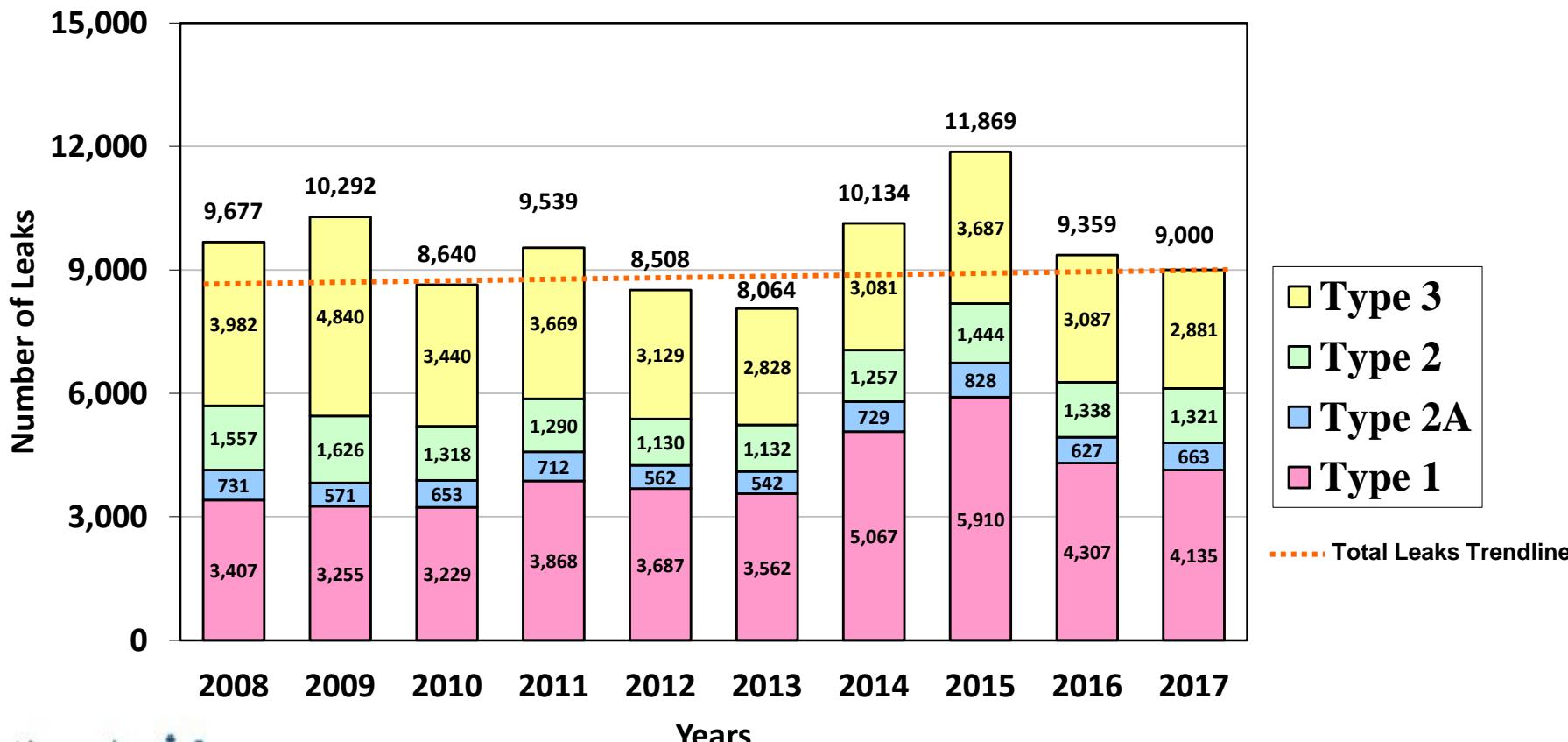


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NY State

LEAK RECEIPTS By ORIGINAL Type

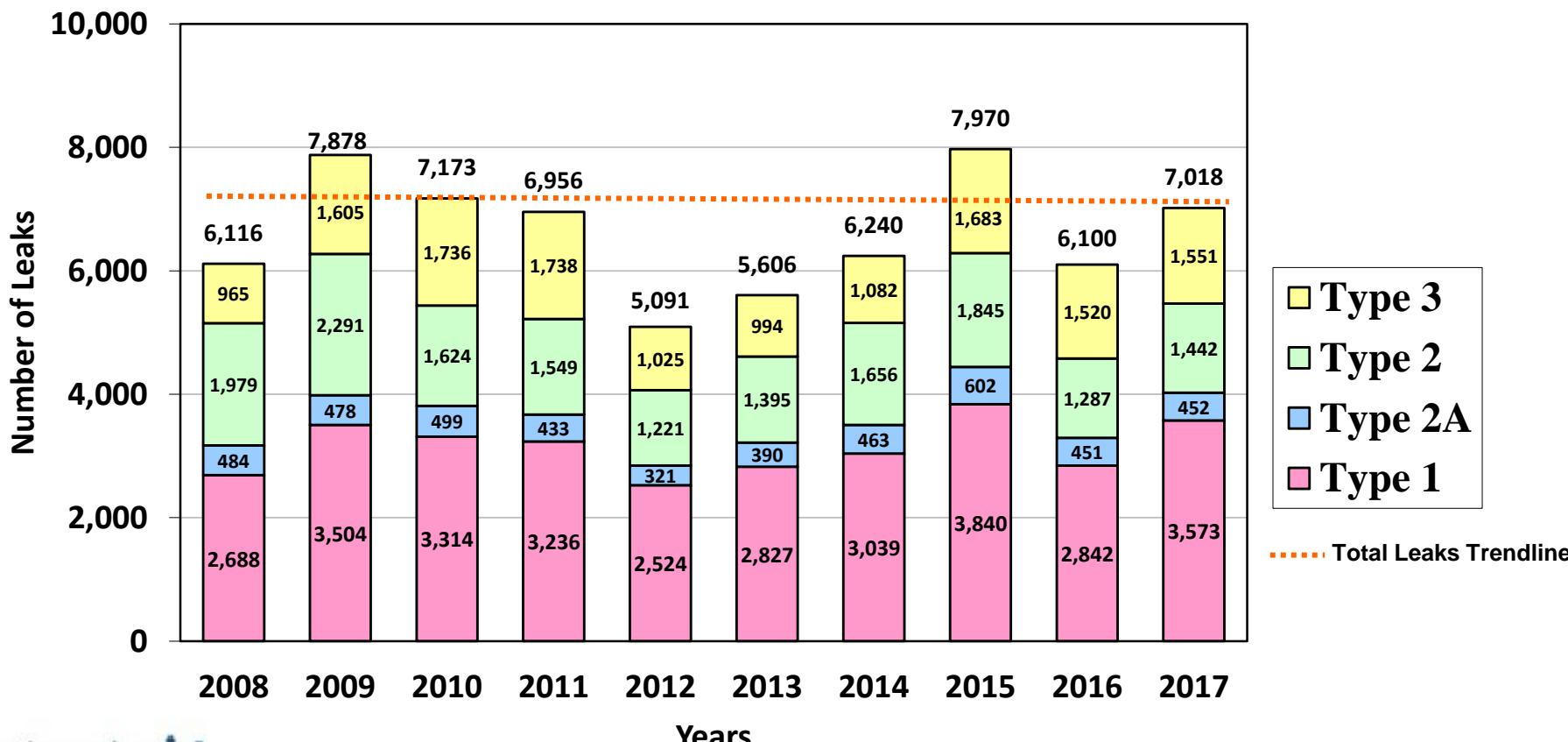
(Excluding Damages)



2017 SYSTEM INTEGRITY REPORT

BGC

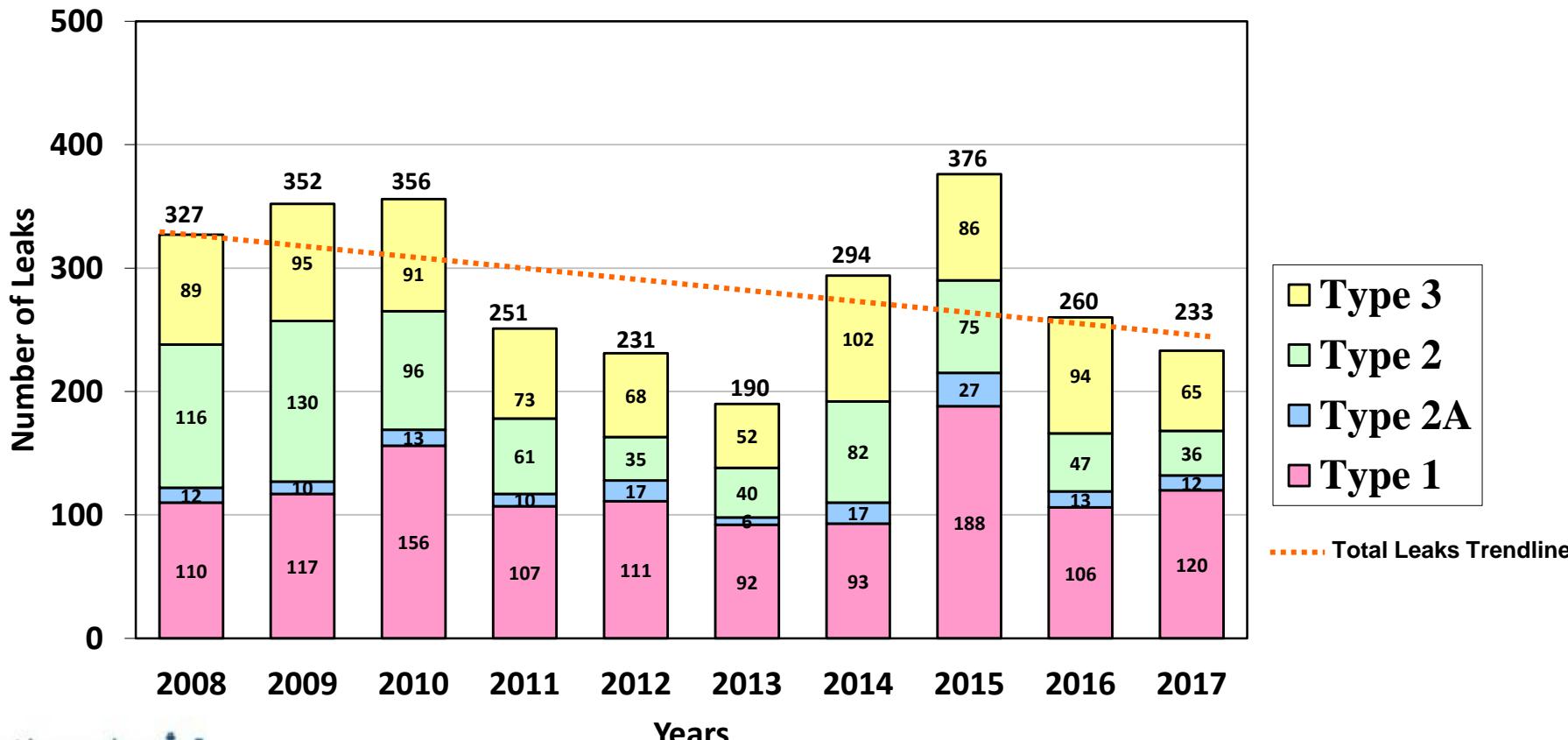
LEAK RECEIPTS By ORIGINAL Type (Excluding Damages)



2017 SYSTEM INTEGRITY REPORT

EGC

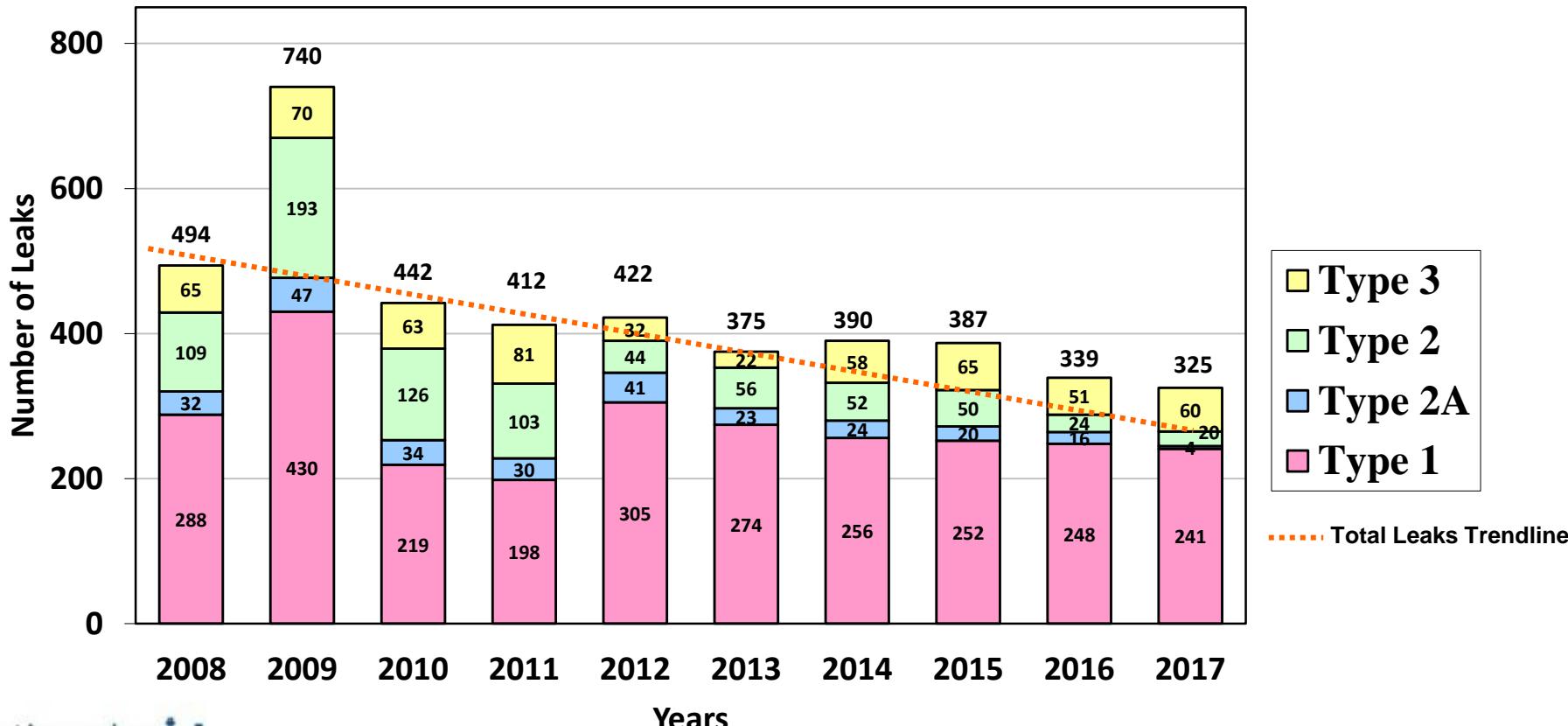
LEAK RECEIPTS By ORIGINAL Type (Excluding Damages)



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CAPE

LEAK RECEIPTS By ORIGINAL Type (Excluding Damages)

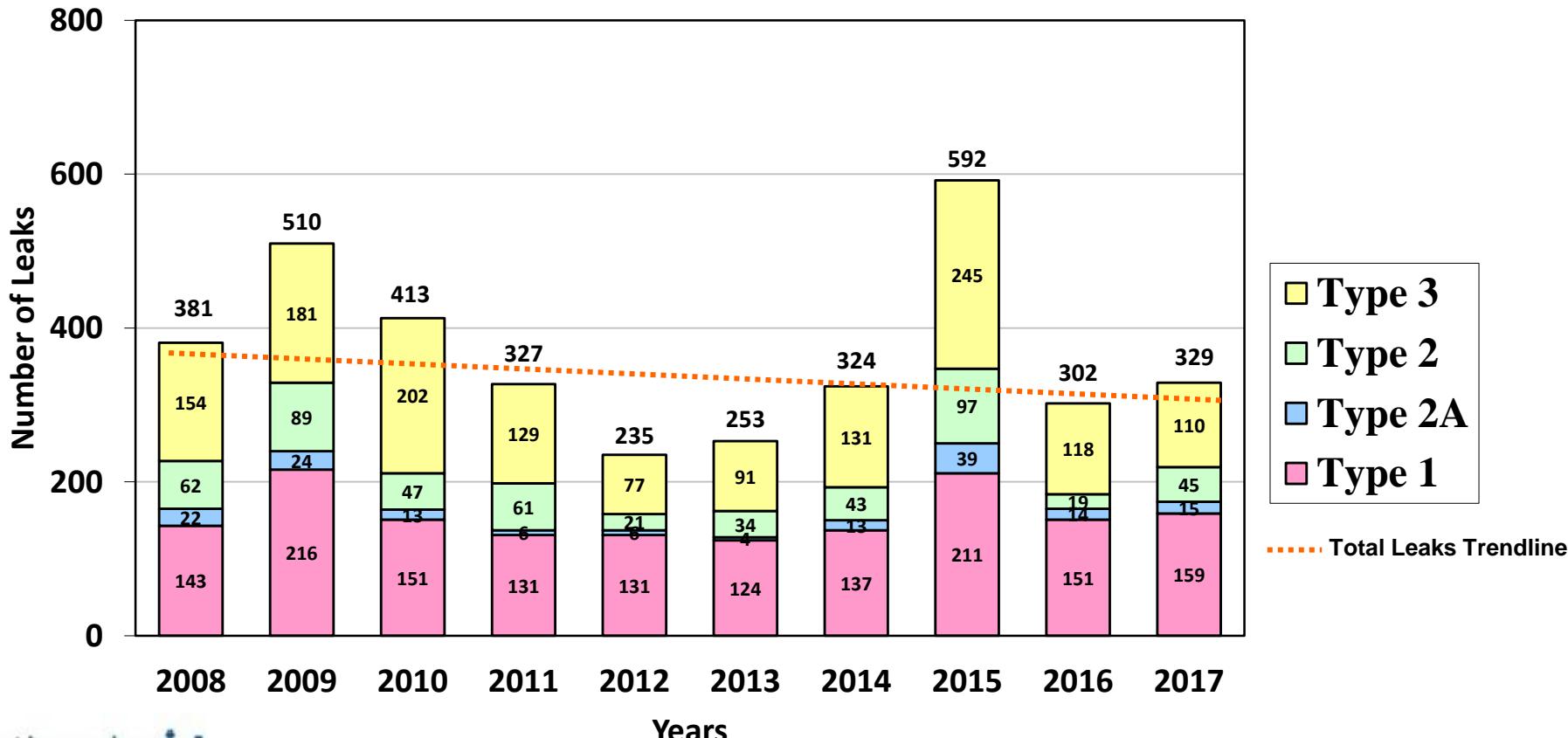


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LOWELL

LEAK RECEIPTS By ORIGINAL Type

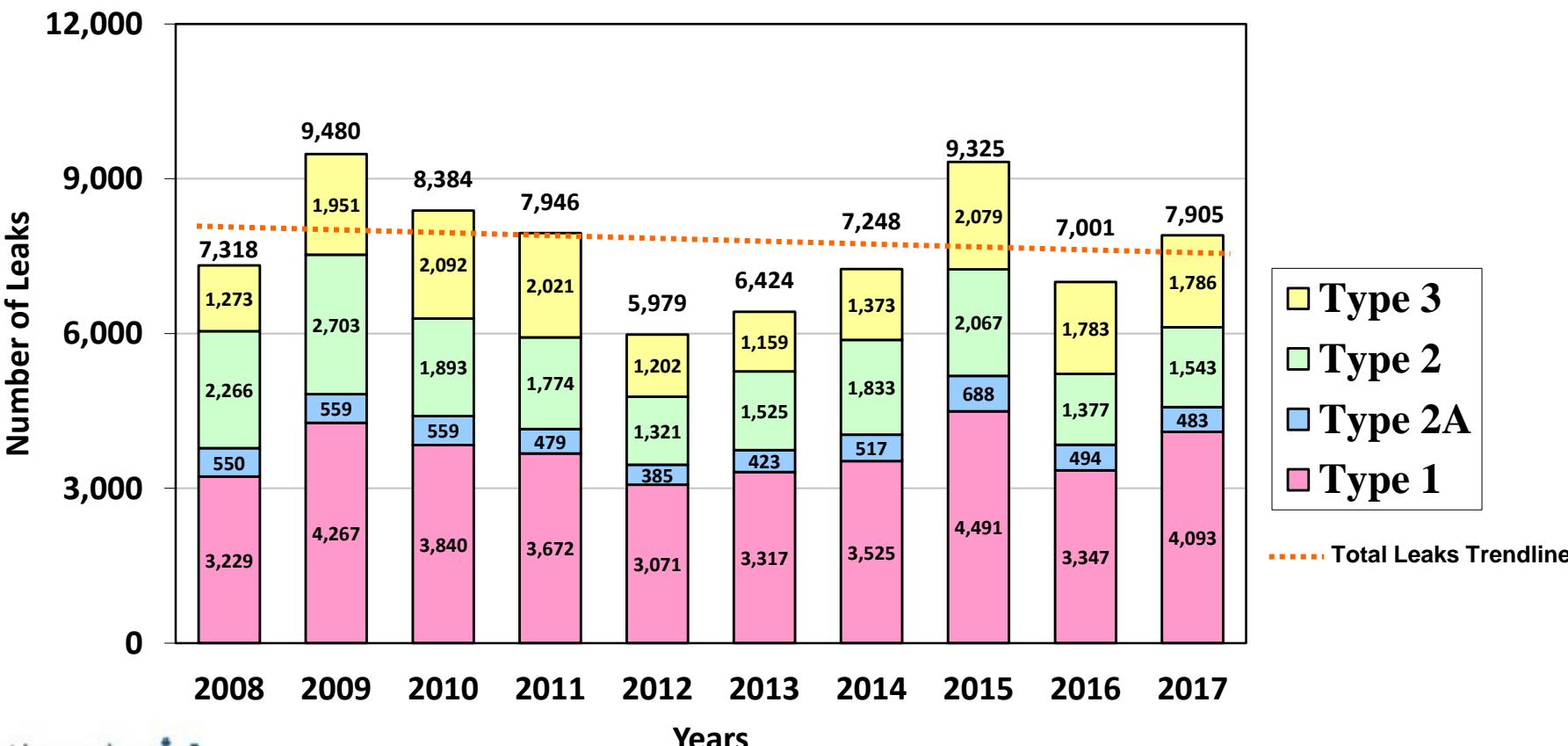
(Excluding Damages)



2017 SYSTEM INTEGRITY REPORT

MA

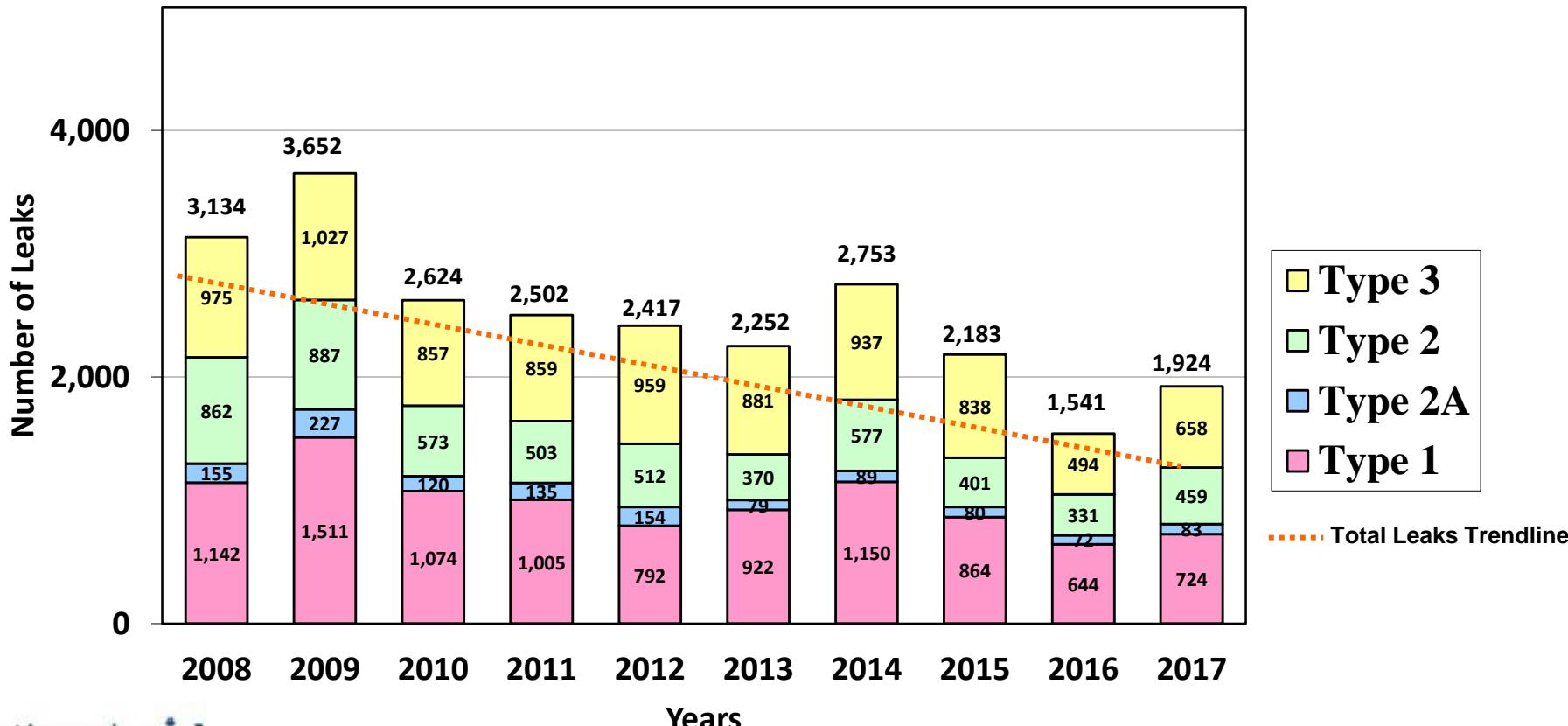
LEAK RECEIPTS By ORIGINAL Type (Excluding Damages)



2017 SYSTEM INTEGRITY REPORT

RI

LEAK RECEIPTS By ORIGINAL Type (Excluding Damages)

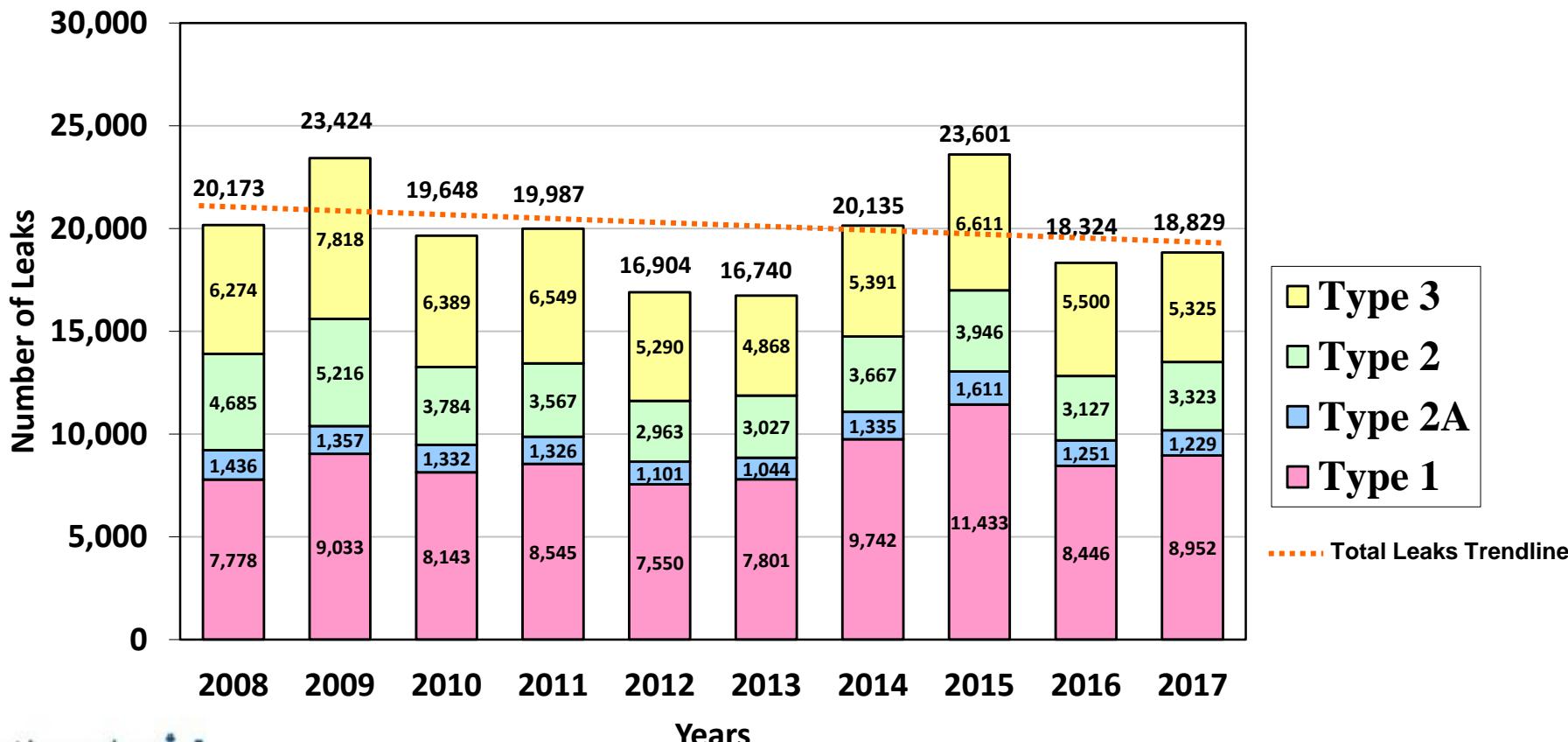


2017 SYSTEM INTEGRITY REPORT

US NGrid

LEAK RECEIPTS By ORIGINAL Type

(Excluding Damages)

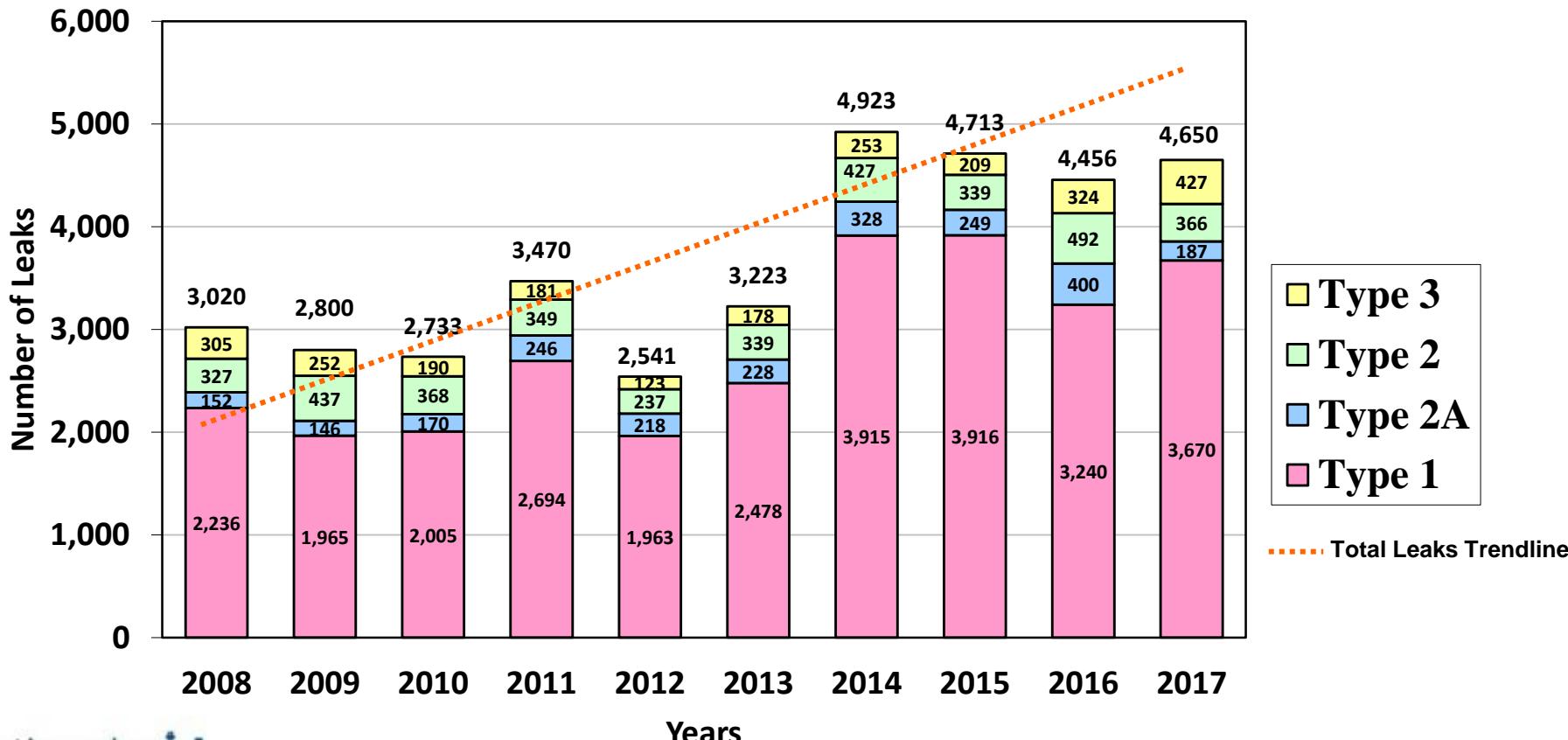


2017 SYSTEM INTEGRITY REPORT

NYC

LEAKS REPAIRED By REPAIRED Type

(Including Damages)

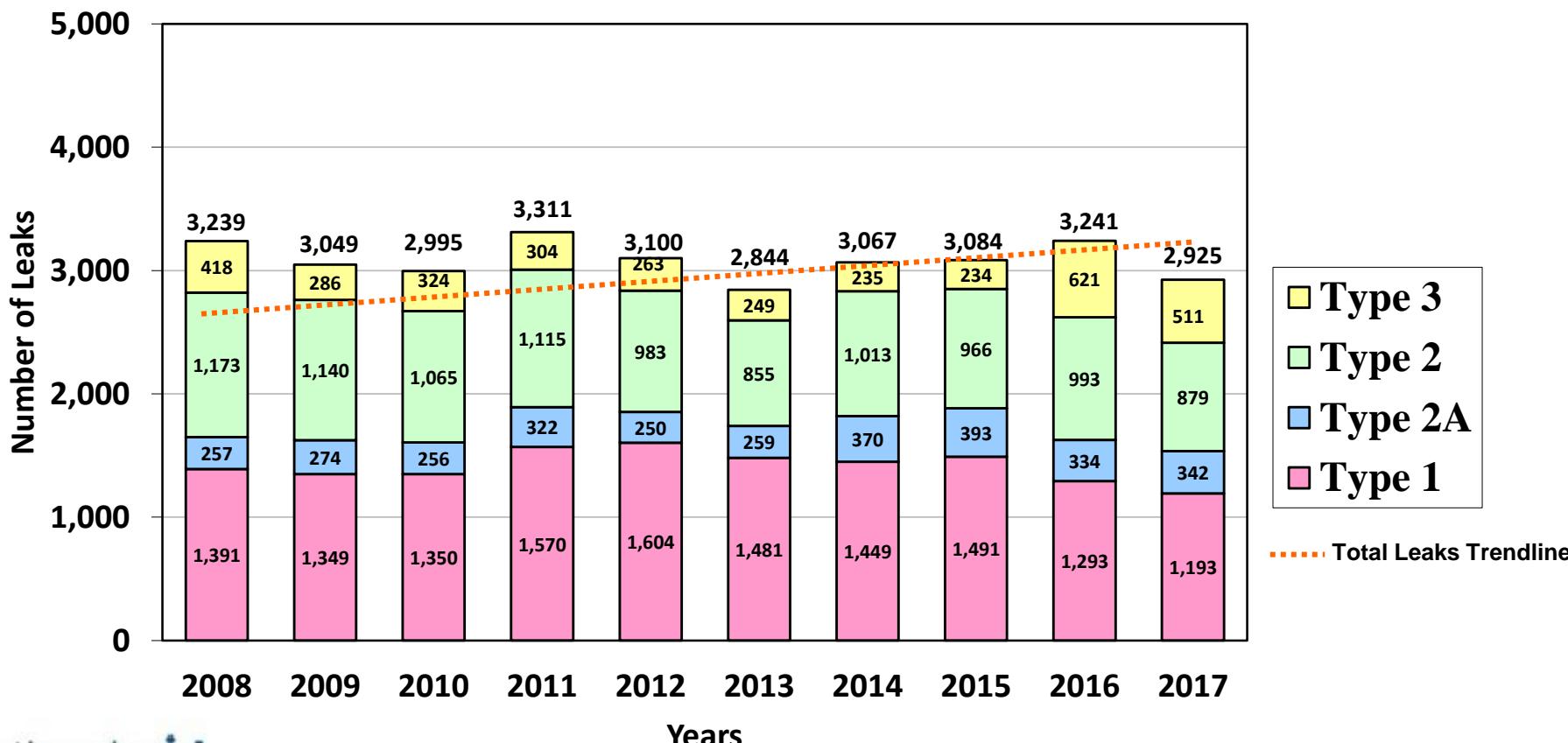


2017 SYSTEM INTEGRITY REPORT



LEAKS REPAIRED By REPAIRED Type

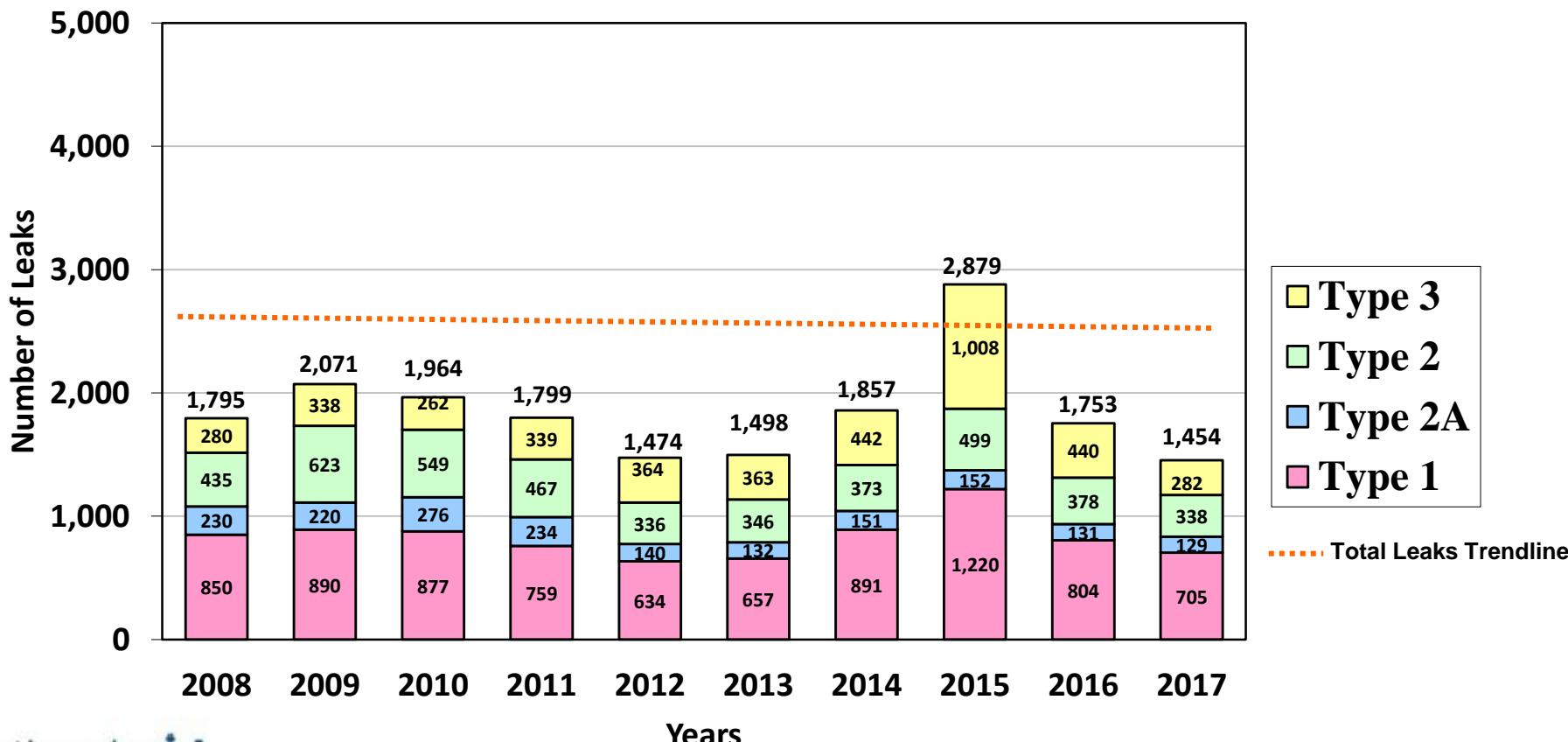
(Including Damages)



2017 SYSTEM INTEGRITY REPORT

UPSTATE LEAKS REPAIRED By REPAIRED Type

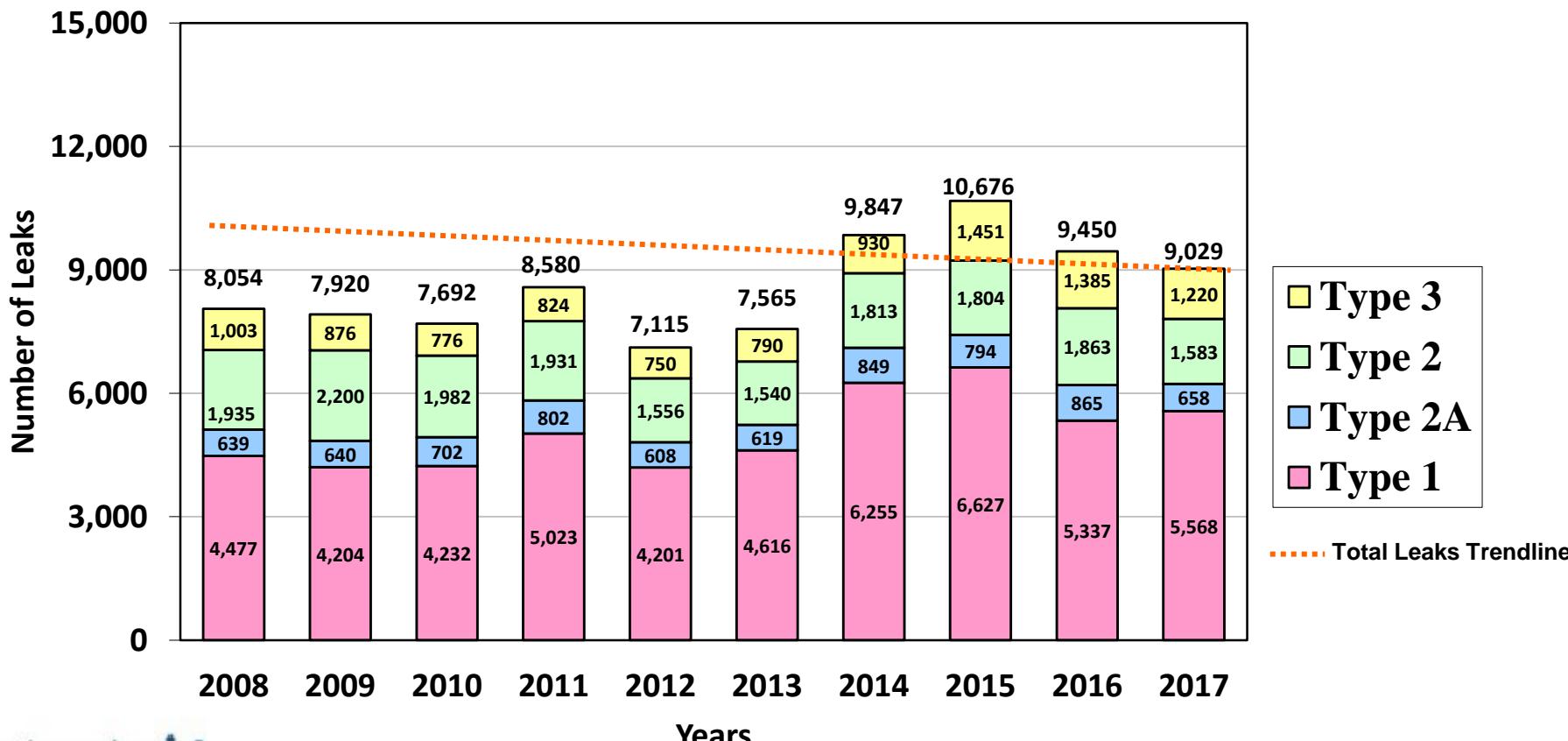
(Including Damages)



2017 SYSTEM INTEGRITY REPORT

NY State LEAKS REPAIRED By REPAIRED Type

(Including Damages)

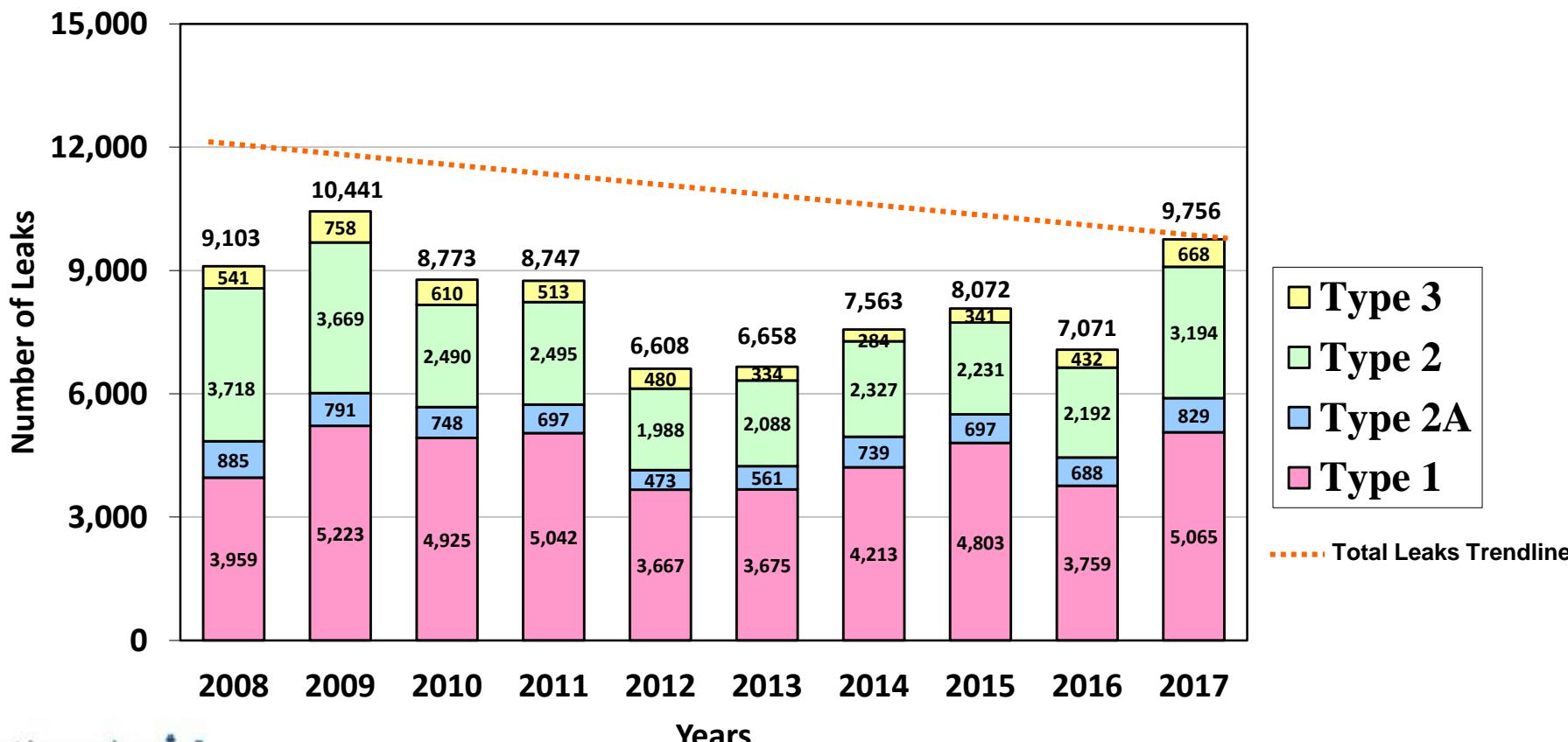


2017 SYSTEM INTEGRITY REPORT

BGC

LEAKS REPAIRED By REPAIRED Type

(Including Damages)

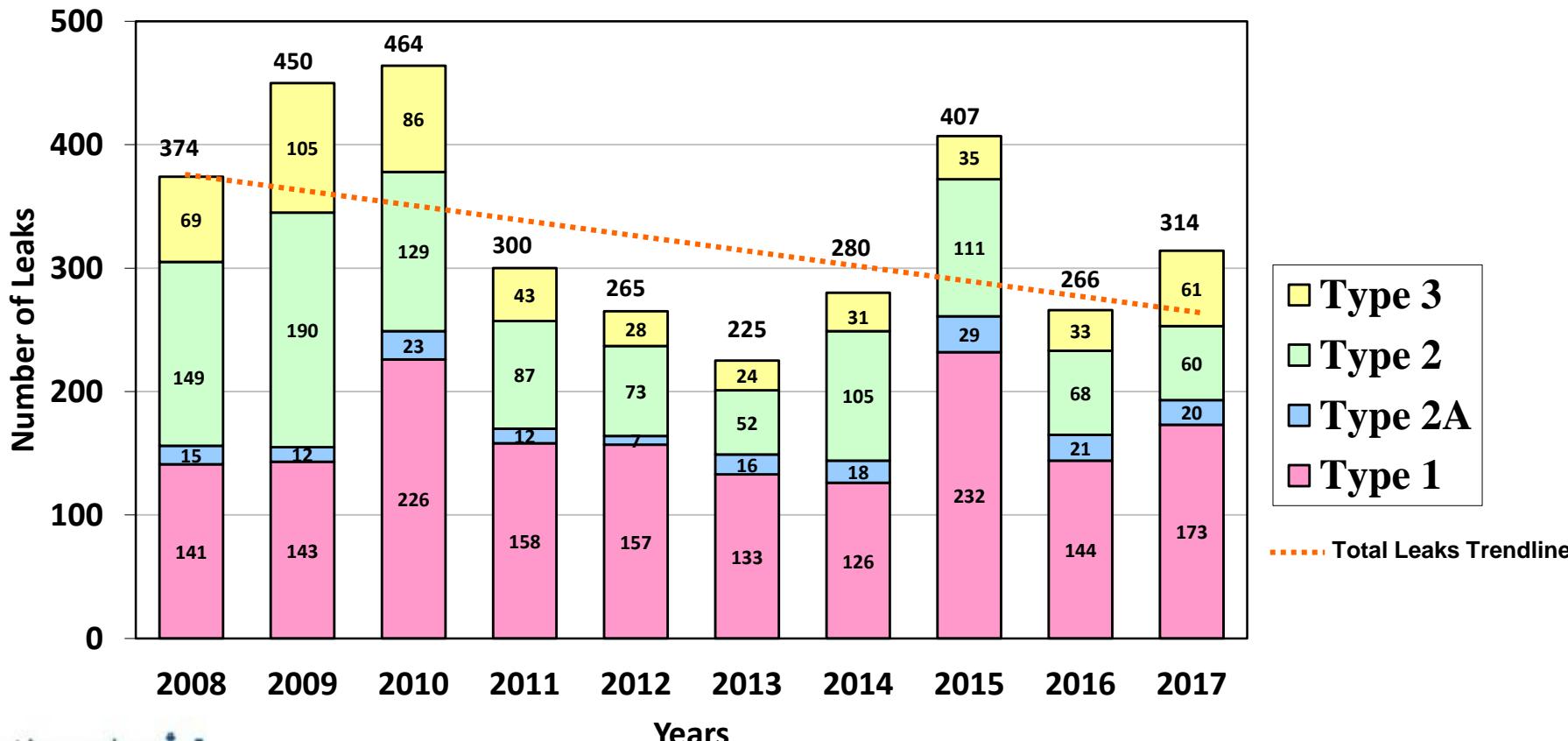


2017 SYSTEM INTEGRITY REPORT

EGC

LEAKS REPAIRED By REPAIRED Type

(Including Damages)

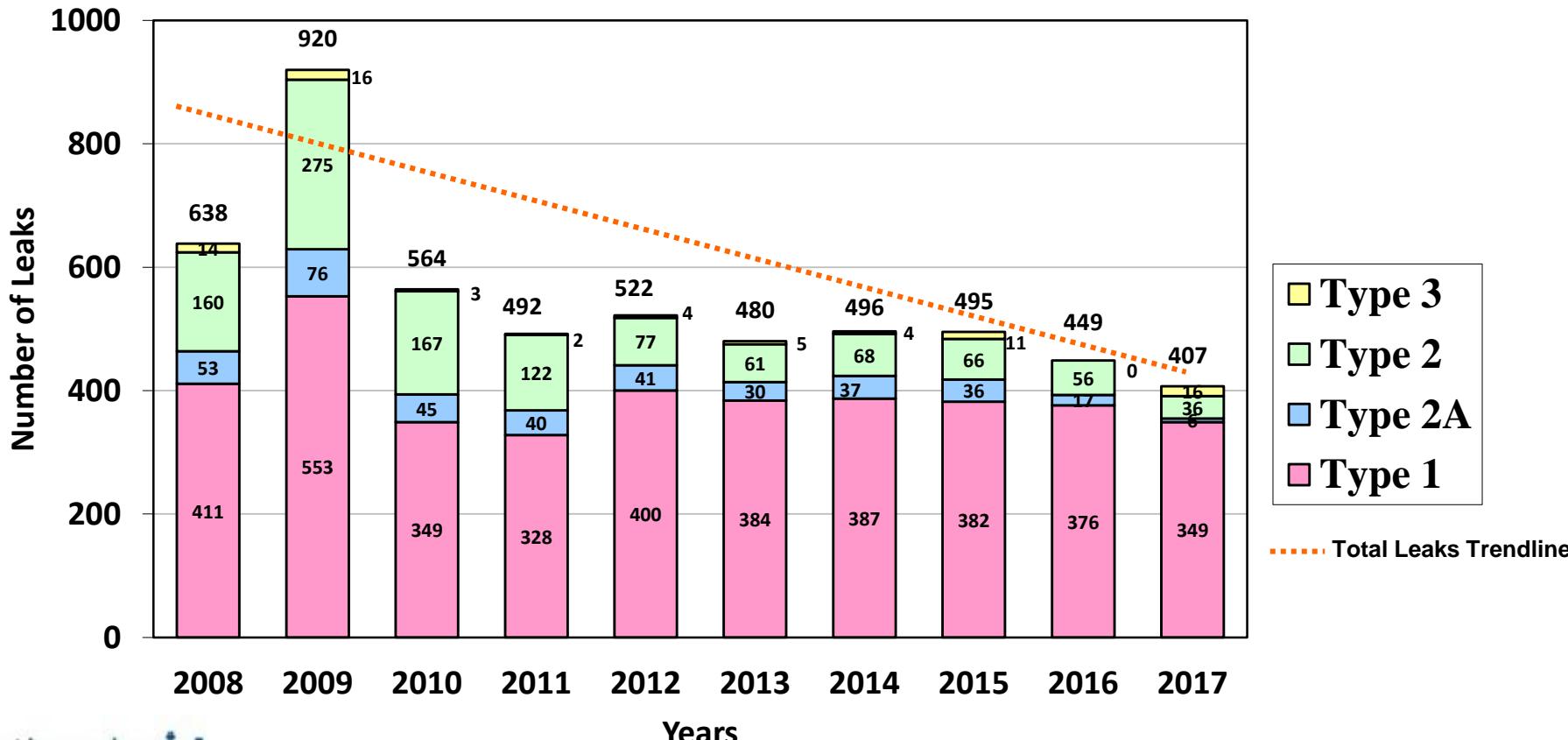


2017 SYSTEM INTEGRITY REPORT

CAPE

LEAKS REPAIRED By REPAIRED Type

(Including Damages)

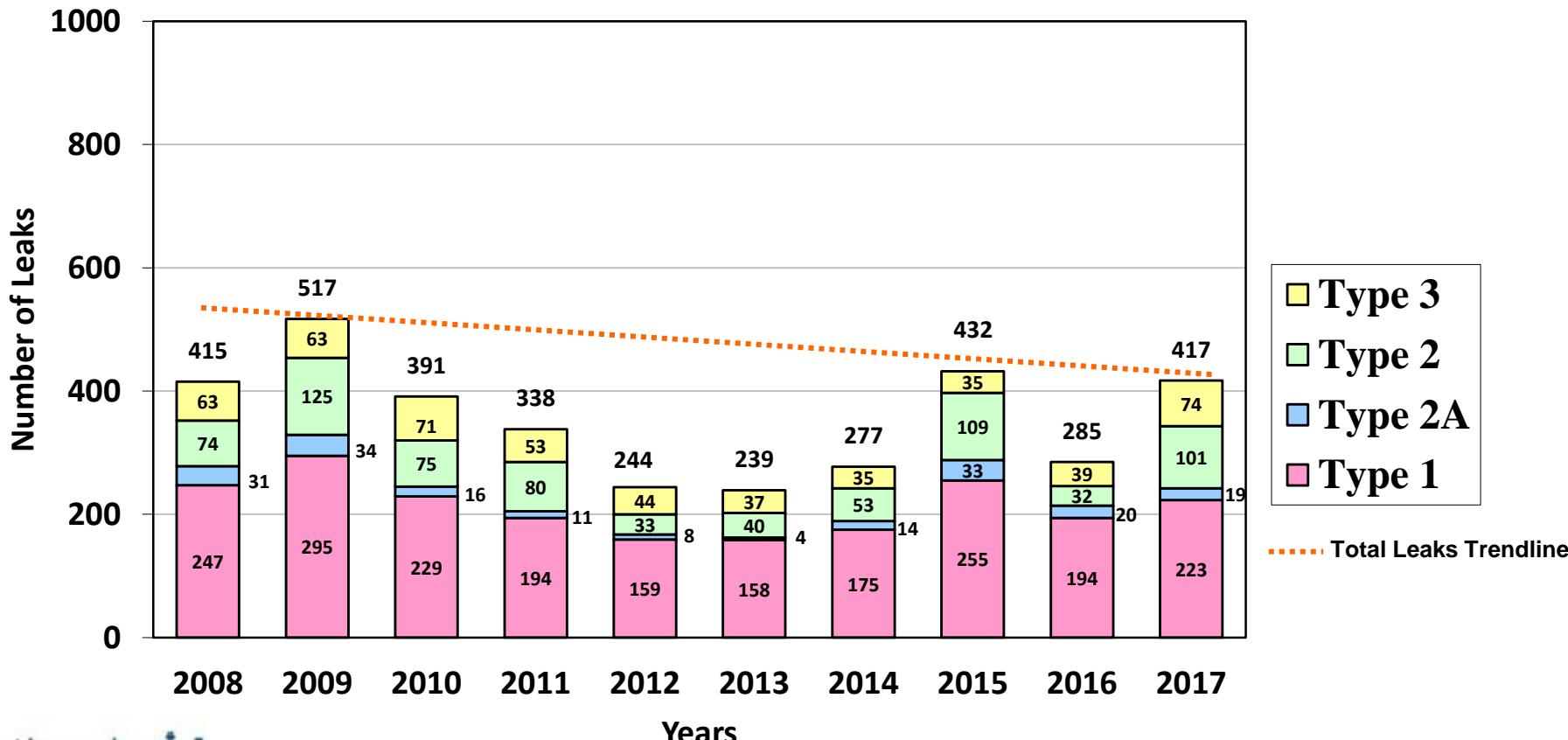


2017 SYSTEM INTEGRITY REPORT

LOWELL

LEAKS REPAIRED By REPAIRED Type

(Including Damages)

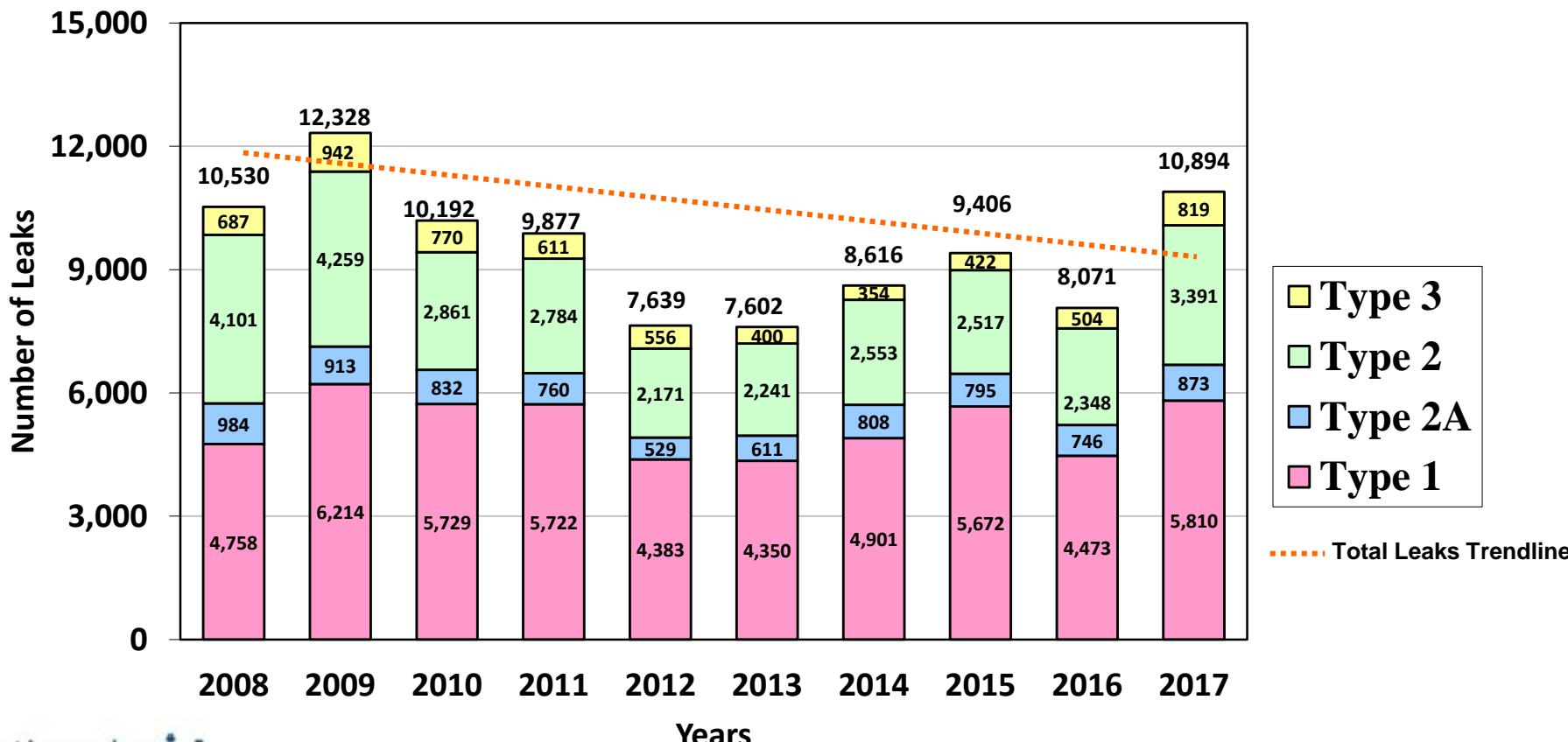


2017 SYSTEM INTEGRITY REPORT

MA

LEAKS REPAIRED By REPAIRED Type

(Including Damages)

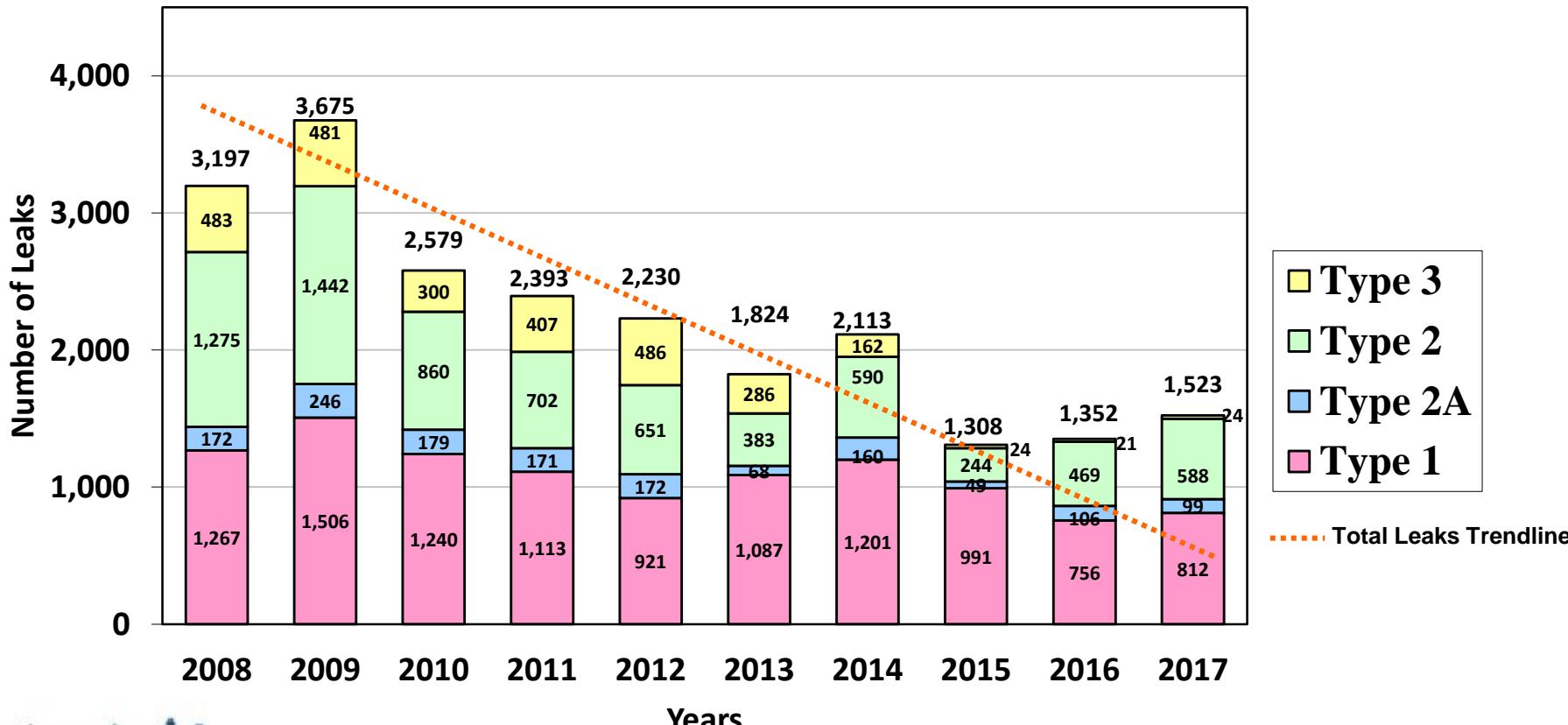


2017 SYSTEM INTEGRITY REPORT

RI

LEAKS REPAIRED By REPAIRED Type

(Including Damages)

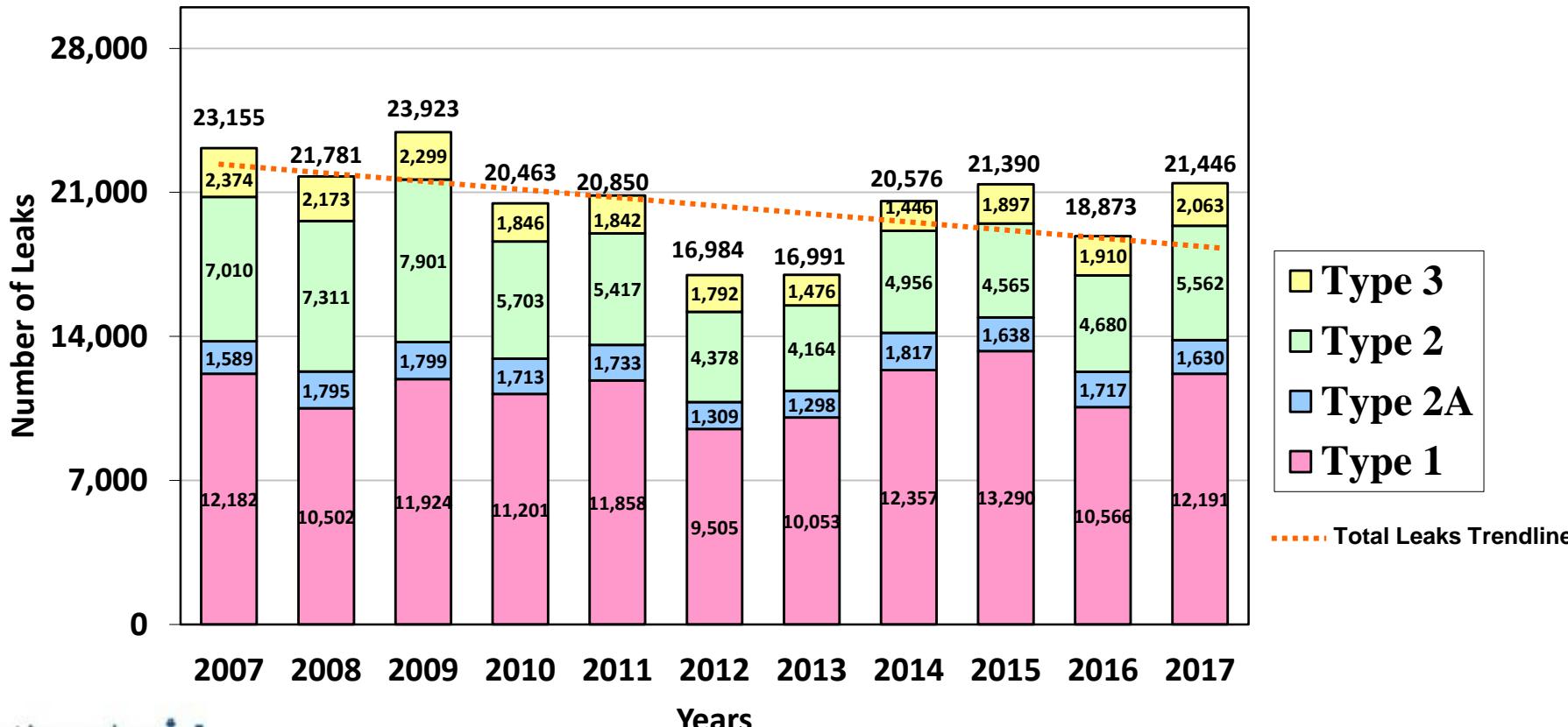


2017 SYSTEM INTEGRITY REPORT

US NGrid

LEAKS REPAIRED By REPAIRED Type

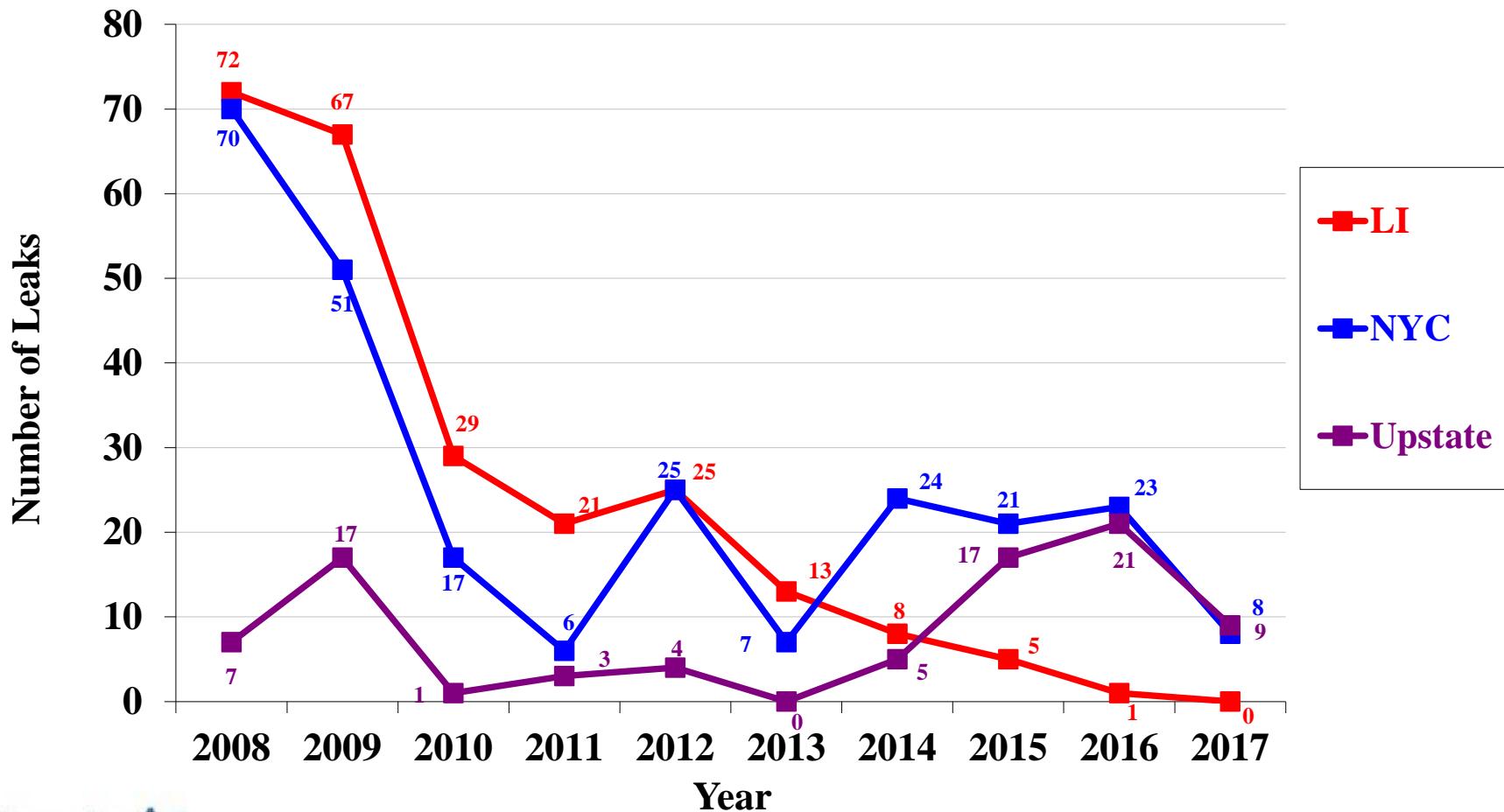
(Including Damages)



2017 SYSTEM INTEGRITY REPORT

NYS

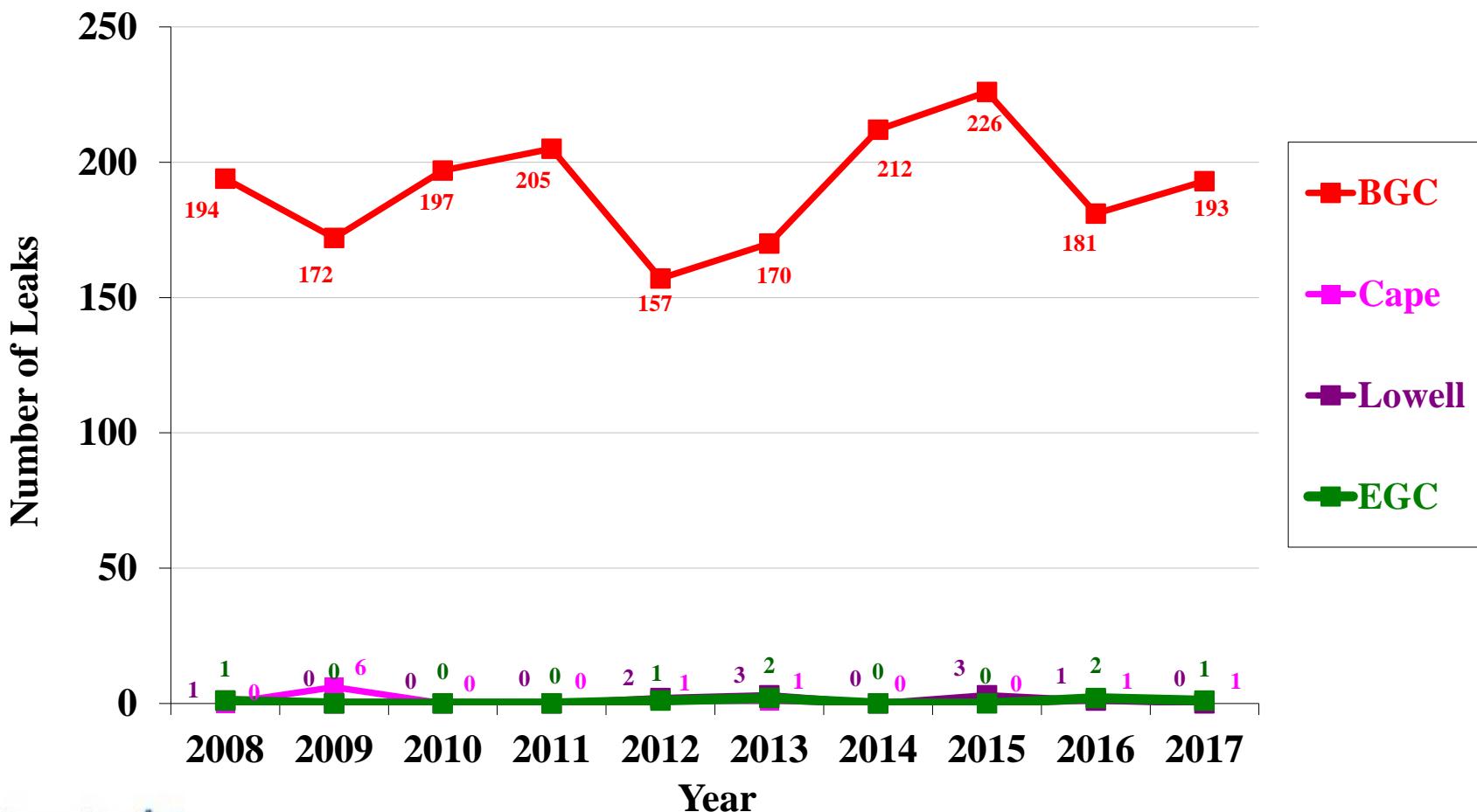
YEAR-END WORKABLE LEAK BACKLOGS



2017 SYSTEM INTEGRITY REPORT

MA

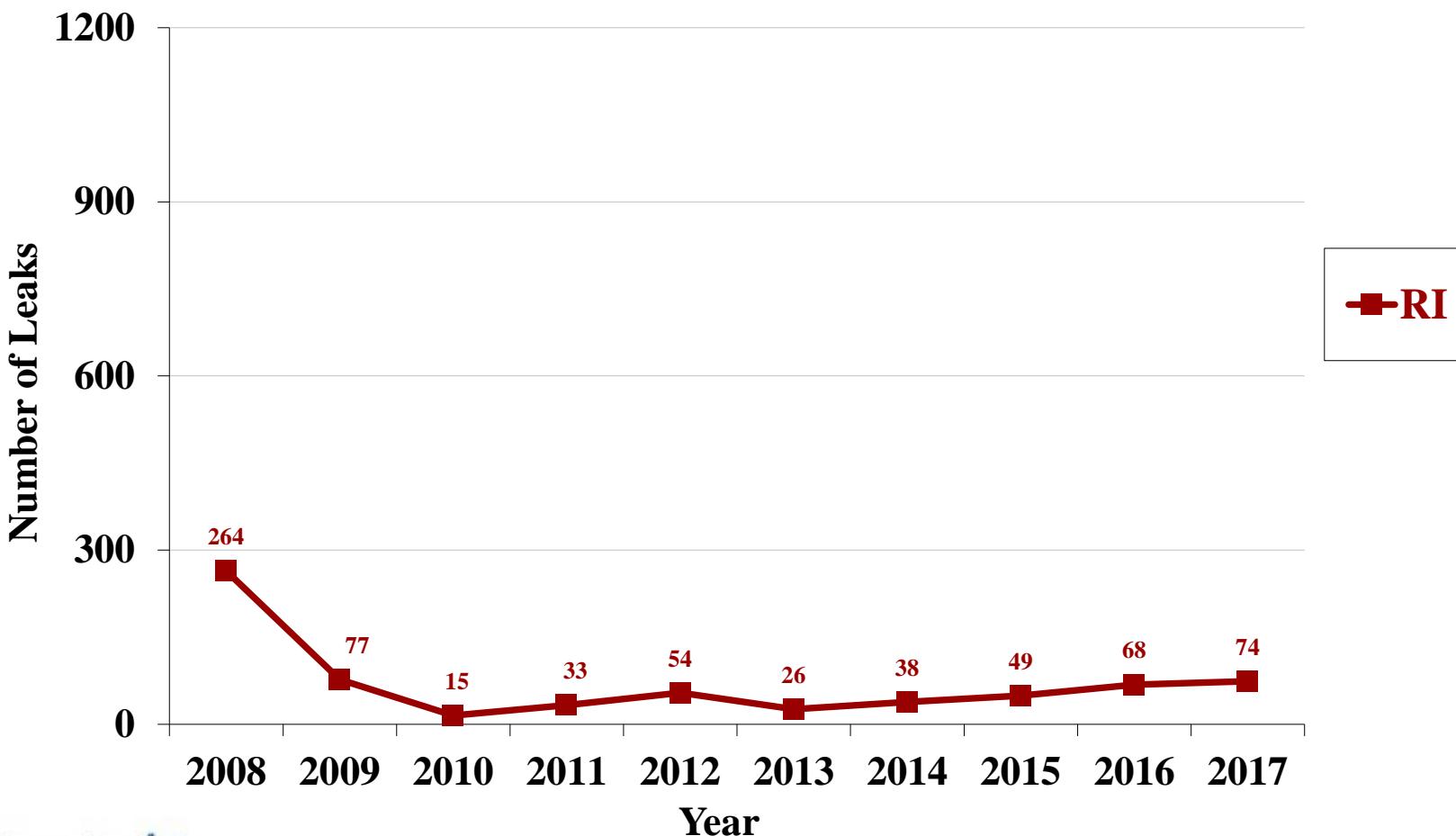
YEAR-END WORKABLE LEAK BACKLOGS



2017 SYSTEM INTEGRITY REPORT

RI

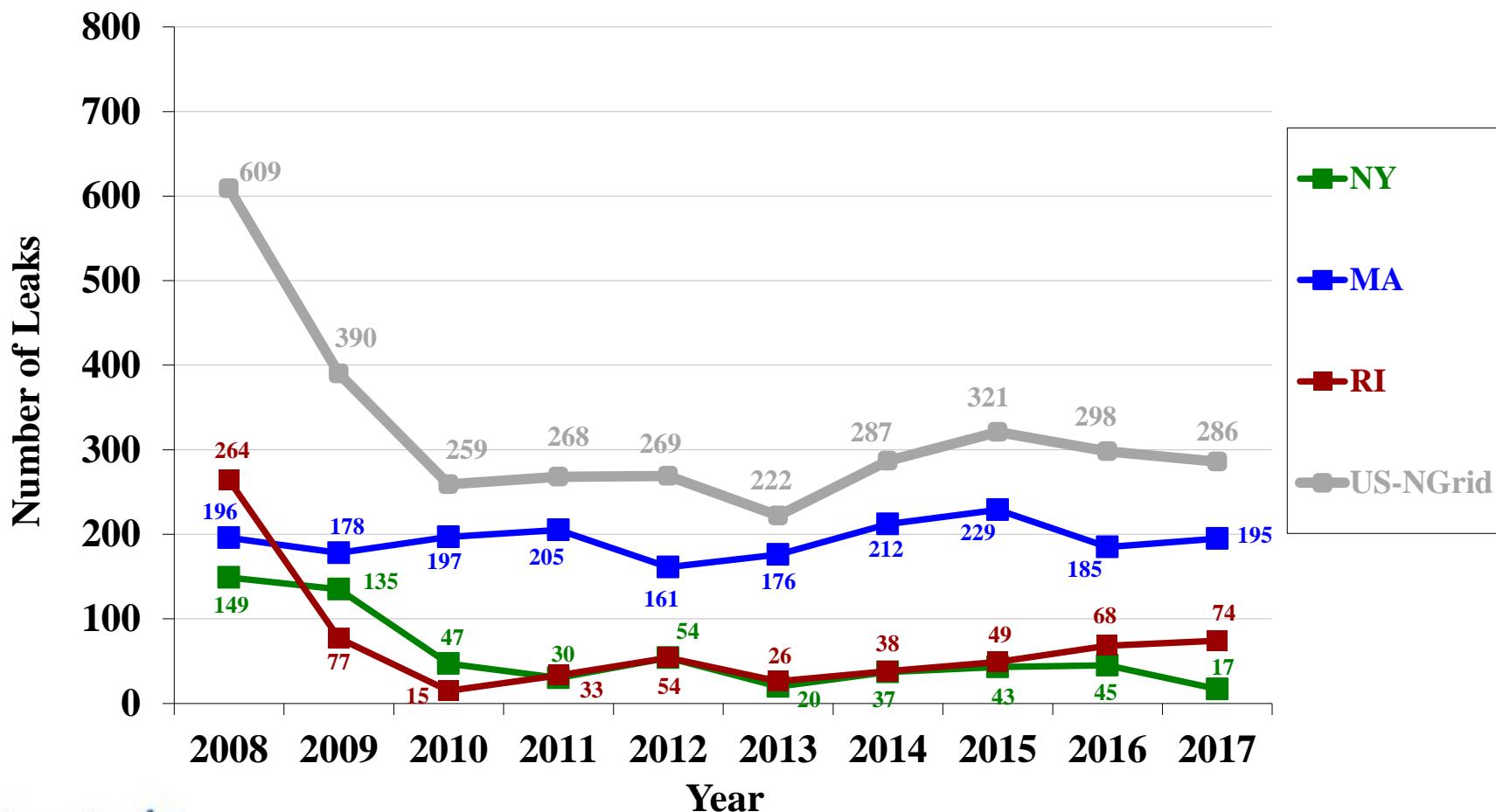
YEAR-END WORKABLE LEAK BACKLOGS



2017 SYSTEM INTEGRITY REPORT

US NGrid

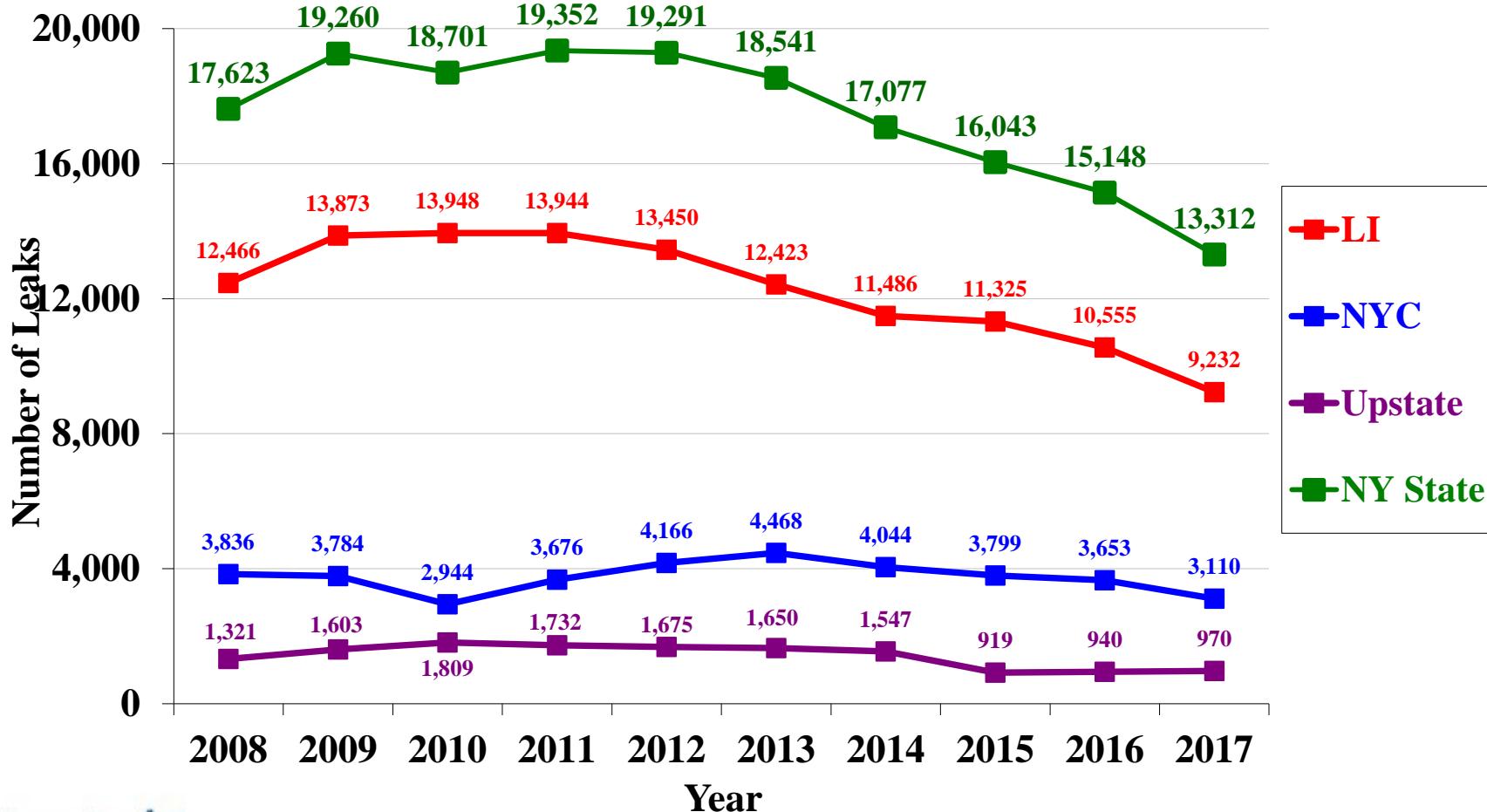
YEAR-END WORKABLE LEAK BACKLOGS



2017 SYSTEM INTEGRITY REPORT

NYS

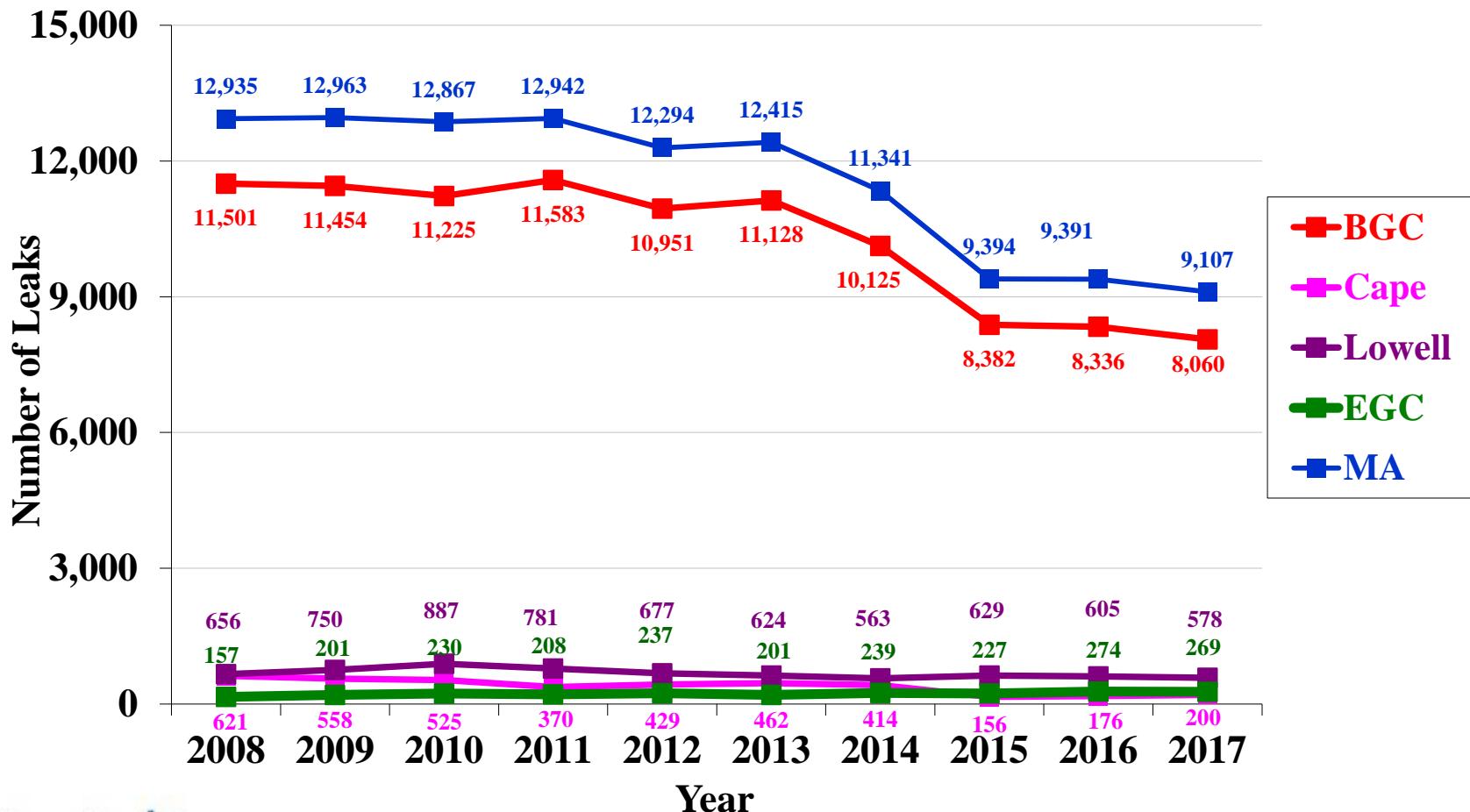
YEAR-END OPEN TYPE 3



2017 SYSTEM INTEGRITY REPORT

MA

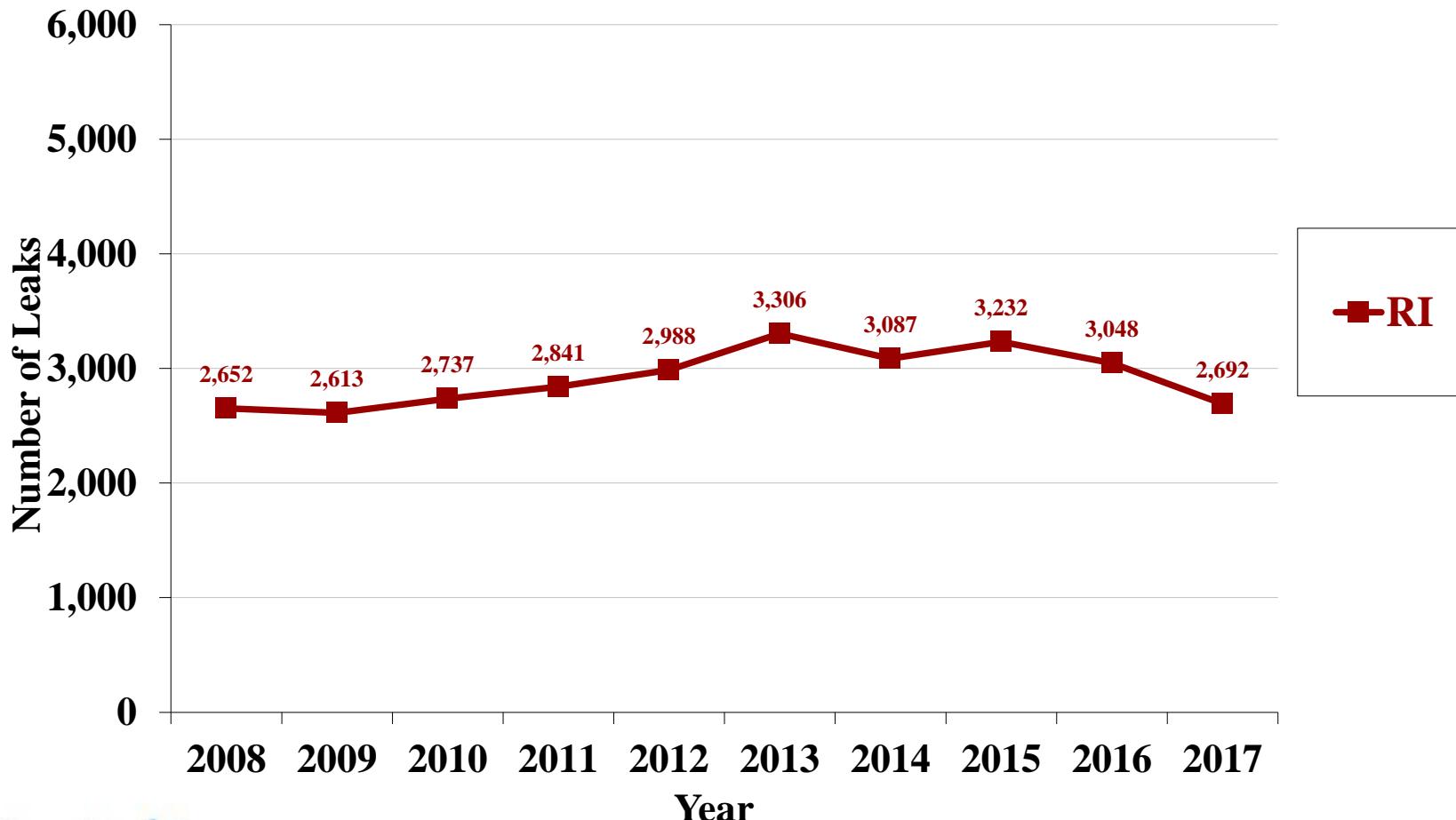
YEAR-END OPEN TYPE 3



2017 SYSTEM INTEGRITY REPORT

RI

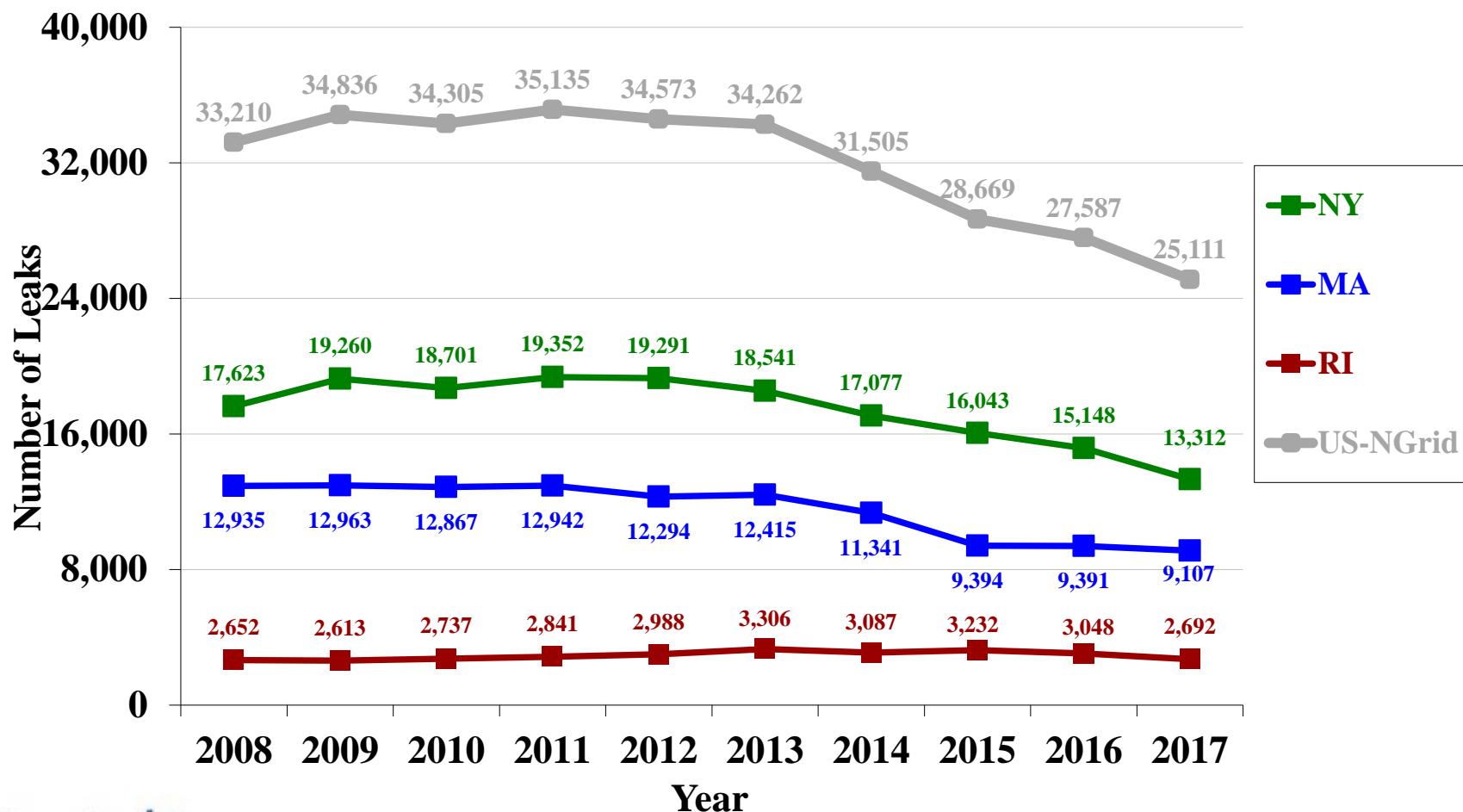
YEAR-END OPEN TYPE 3



2017 SYSTEM INTEGRITY REPORT

US NGrid

YEAR-END OPEN TYPE 3



2017 SYSTEM INTEGRITY REPORT

**PHMSA Reported
Incidents Cost**

2017 SYSTEM INTEGRITY REPORT

The objective of this section is to identify potential threats to the gas distribution pipeline. The following categories of threats are considered for each gas distribution pipeline:

CORROSION - Used when gas is leaking from a hole, crack or porosity in the pipe or other gas-carrying member and that condition was caused by corrosion (or graphitization for cast iron).

NATURAL FORCES - Used when the leak is directly caused by undermining, earth movement, lightning, floods, washouts, frost heave, frozen components, etc.

EXCAVATION DAMAGE - Used when the leak is directly caused by current or previous physical damage (impact) that can be attributed to someone.

OTHER OUTSIDE FORCE - Used only when the leak is directly caused by fire, explosion, electric burn-throughs or a deliberate/willful act such as vandalism. Damage from vehicle or vessels not engaged in excavation.

PIPE, WELD OR JOINT FAILURE - Used for leaks occurring on faulty material; such as faulty bends, joint due to faulty manufacturing, faulty field welds/fuses or material damaged in transportation or during installation.

EQUIPMENT FAILURE - Used for leaks caused by malfunction of control/relief equipment (including valves, regulators or other instrumentation); stripped threads or broken pipe, couplings on nipples, valves or mechanical couplings; seal failures on gaskets; O-rings or seal/pump packing.

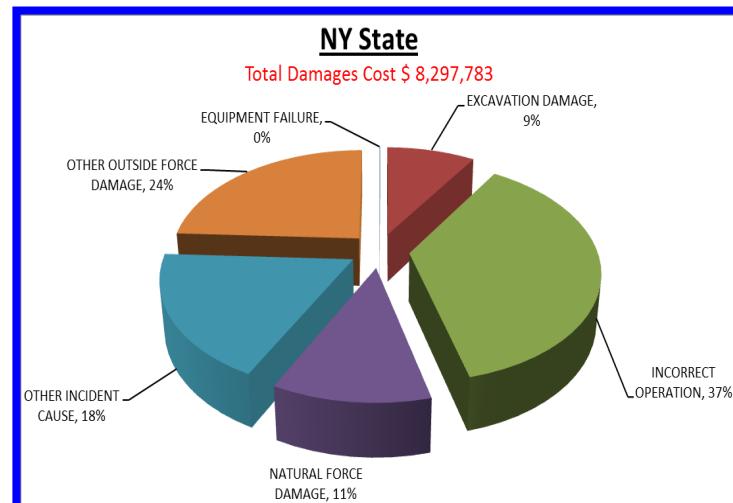
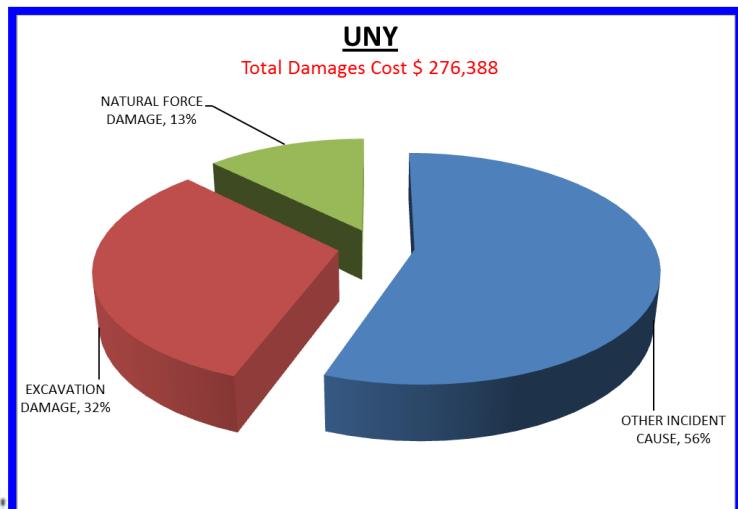
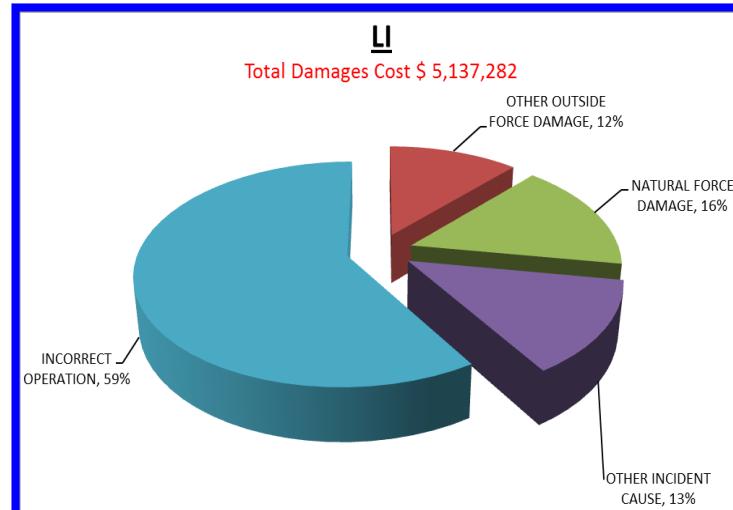
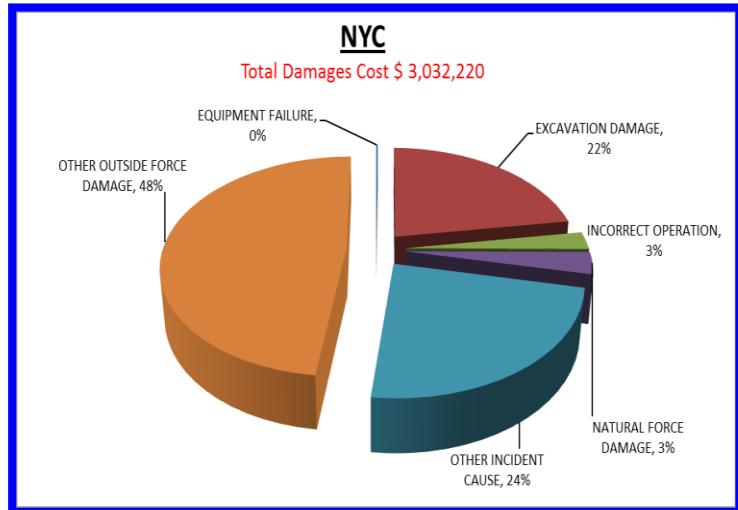
INCORRECT OPERATION - used for a leak caused by operator error, inadequate safety practices/procedures or failure to follow procedures.

Other - Used for leaks that are the result of deterioration (*NOT* corrosion) such as Cast Iron Joint leaks, exceeding the normal service life or any other cause not covered above.

2017 SYSTEM INTEGRITY REPORT

NYS TOTAL PROPERTY DAMAGES

PHMSA Incident data from 2010 to 2017

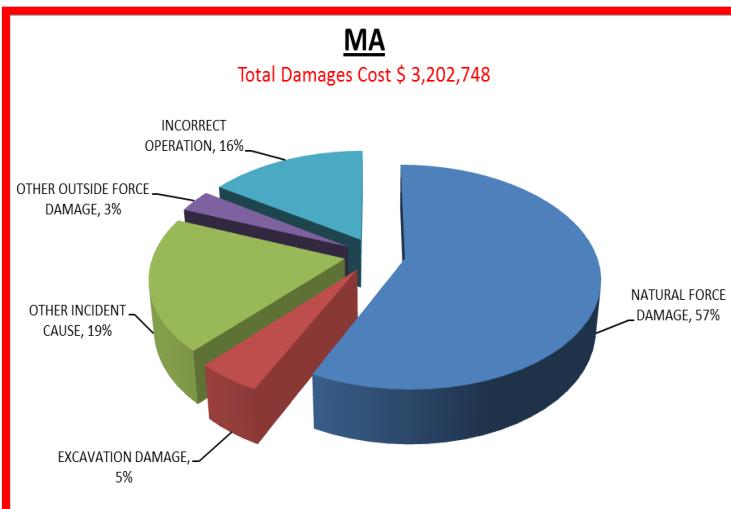
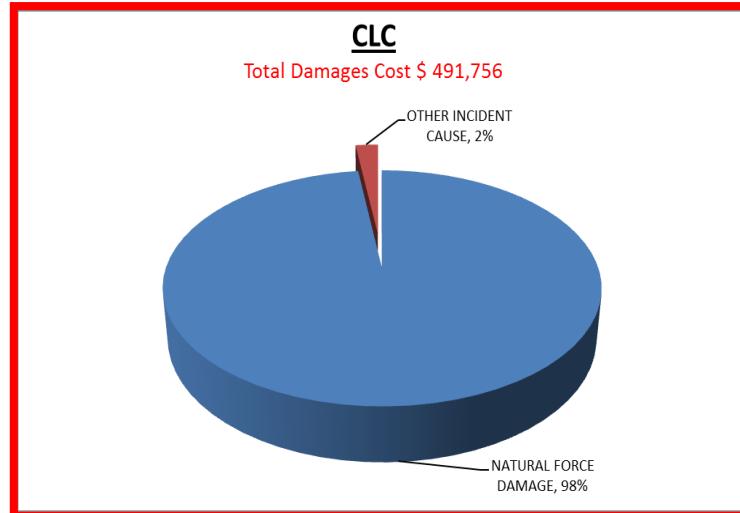
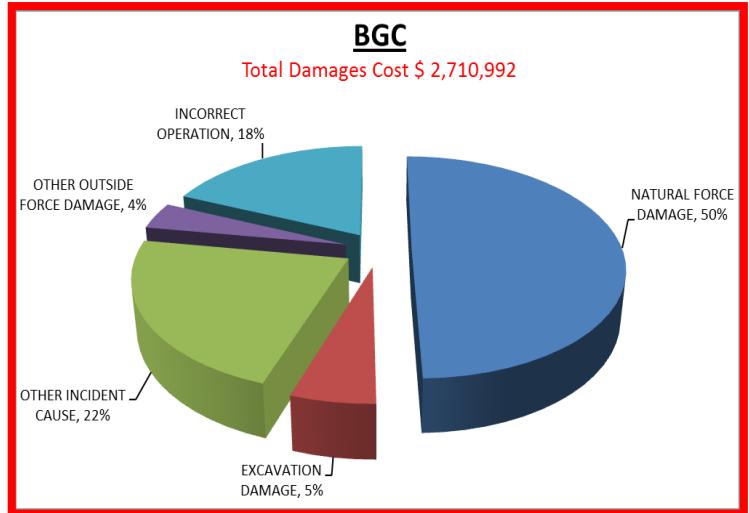


2017 SYSTEM INTEGRITY REPORT

MA

TOTAL PROPERTY DAMAGES

PHMSA Incident data from 2010 to 2017

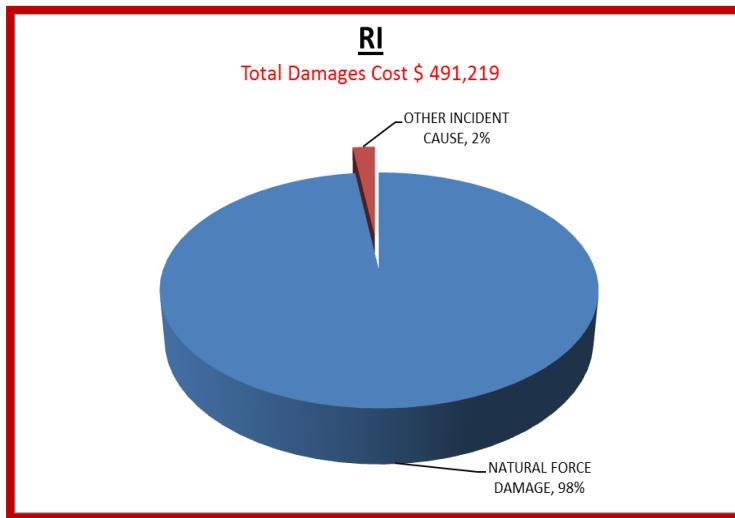


2017 SYSTEM INTEGRITY REPORT

RI

TOTAL PROPERTY DAMAGES

PHMSA Incident data from 2010 to 2017

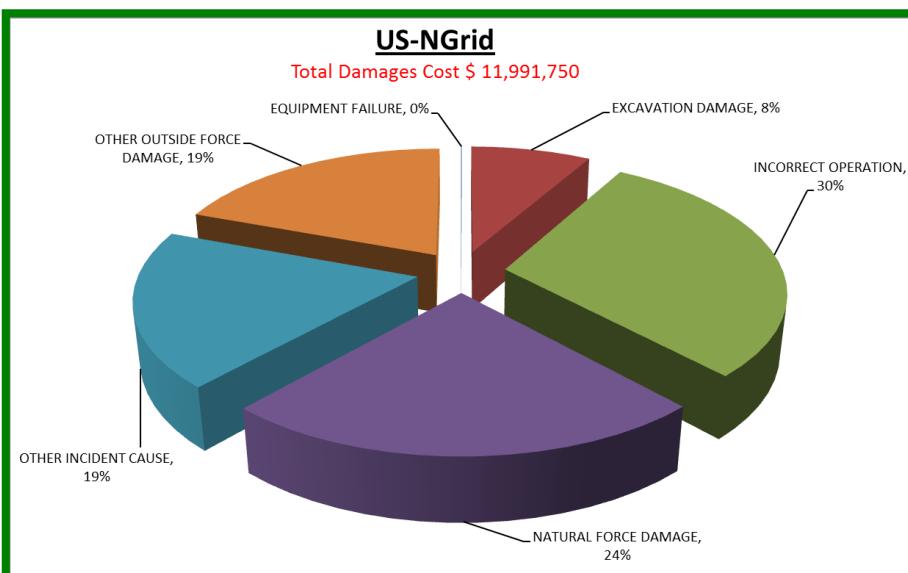
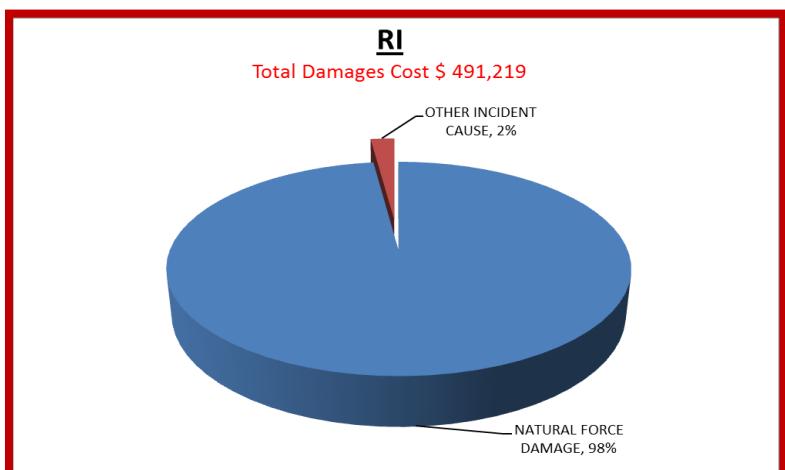
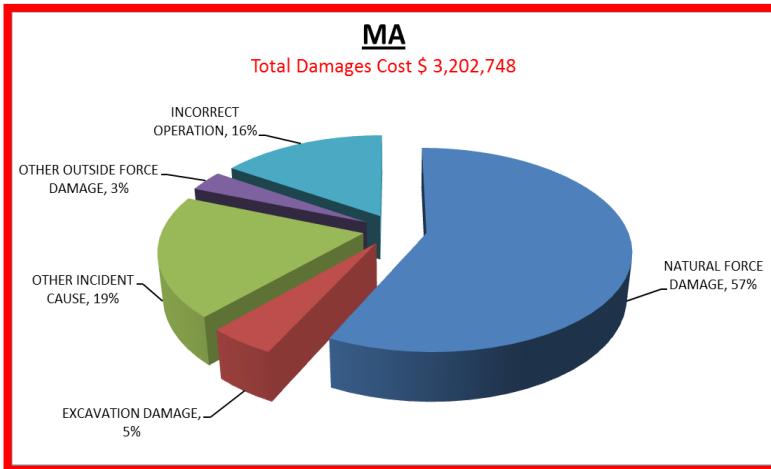
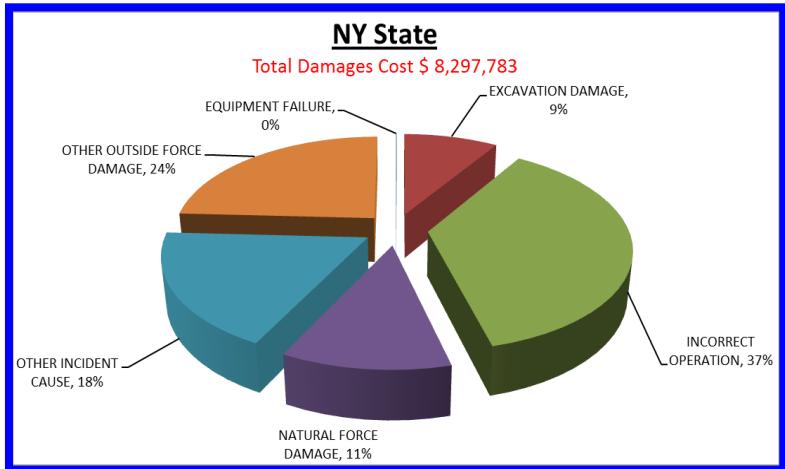


2017 SYSTEM INTEGRITY REPORT

NGrid

TOTAL PROPERTY DAMAGES

PHMSA Incident data from 2010 to 2017



nationalgrid

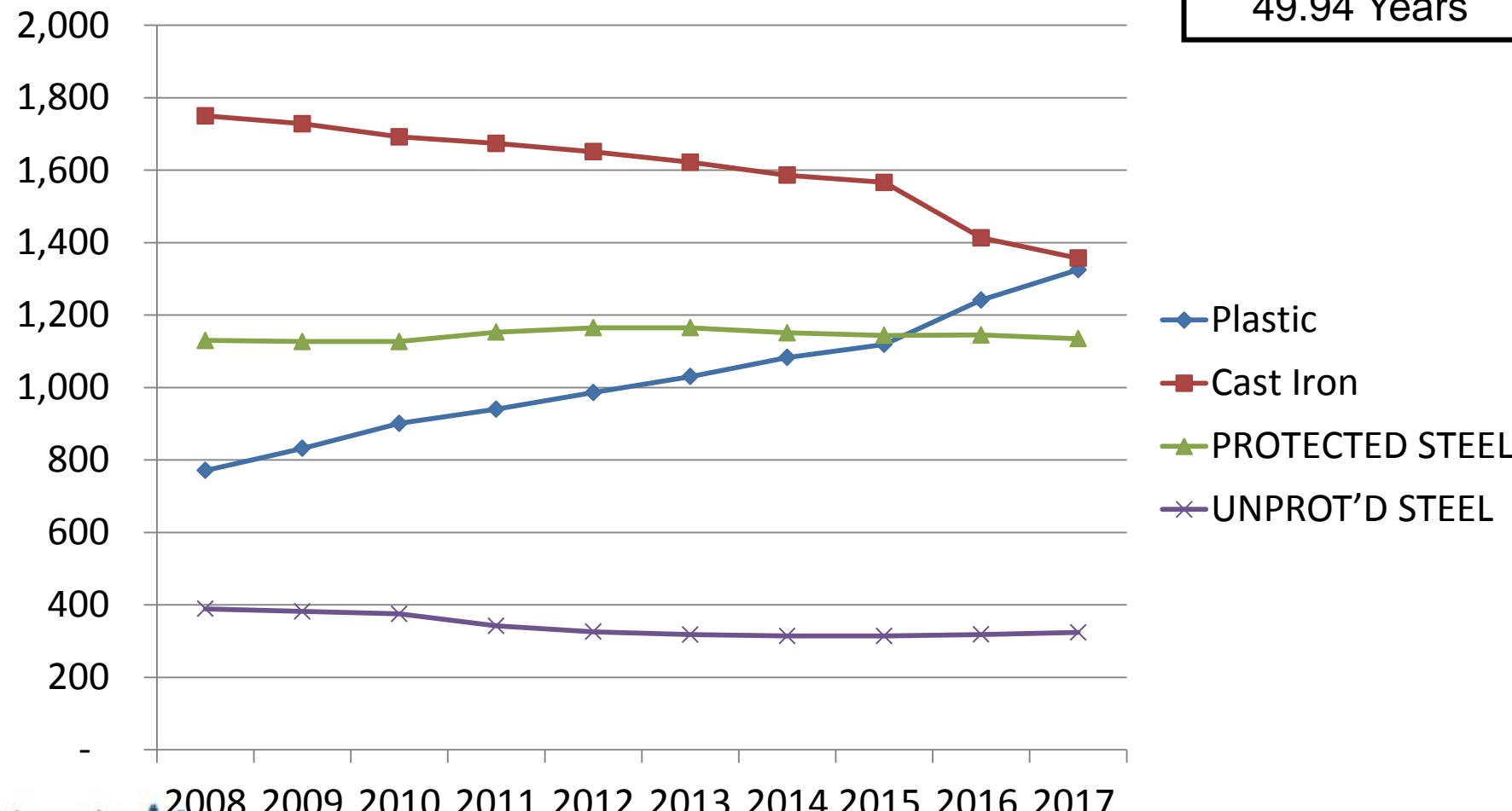
2017 SYSTEM INTEGRITY REPORT

MAIN INVENTORY ANALYSIS

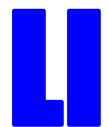
2017 SYSTEM INTEGRITY REPORT

NYC

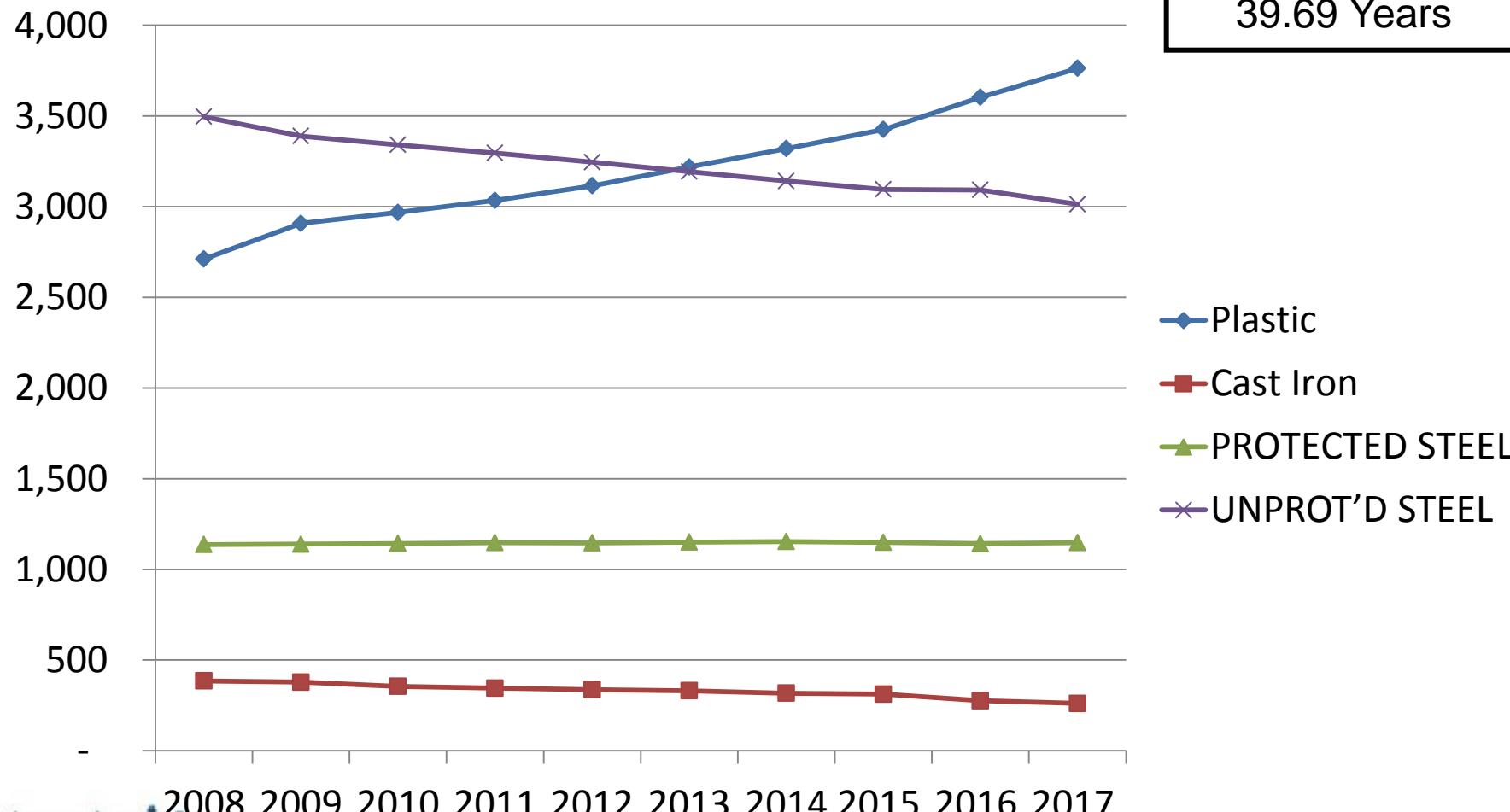
MAIN INVENTORY TREND (MILES)



2017 SYSTEM INTEGRITY REPORT



MAIN INVENTORY TREND (MILES)

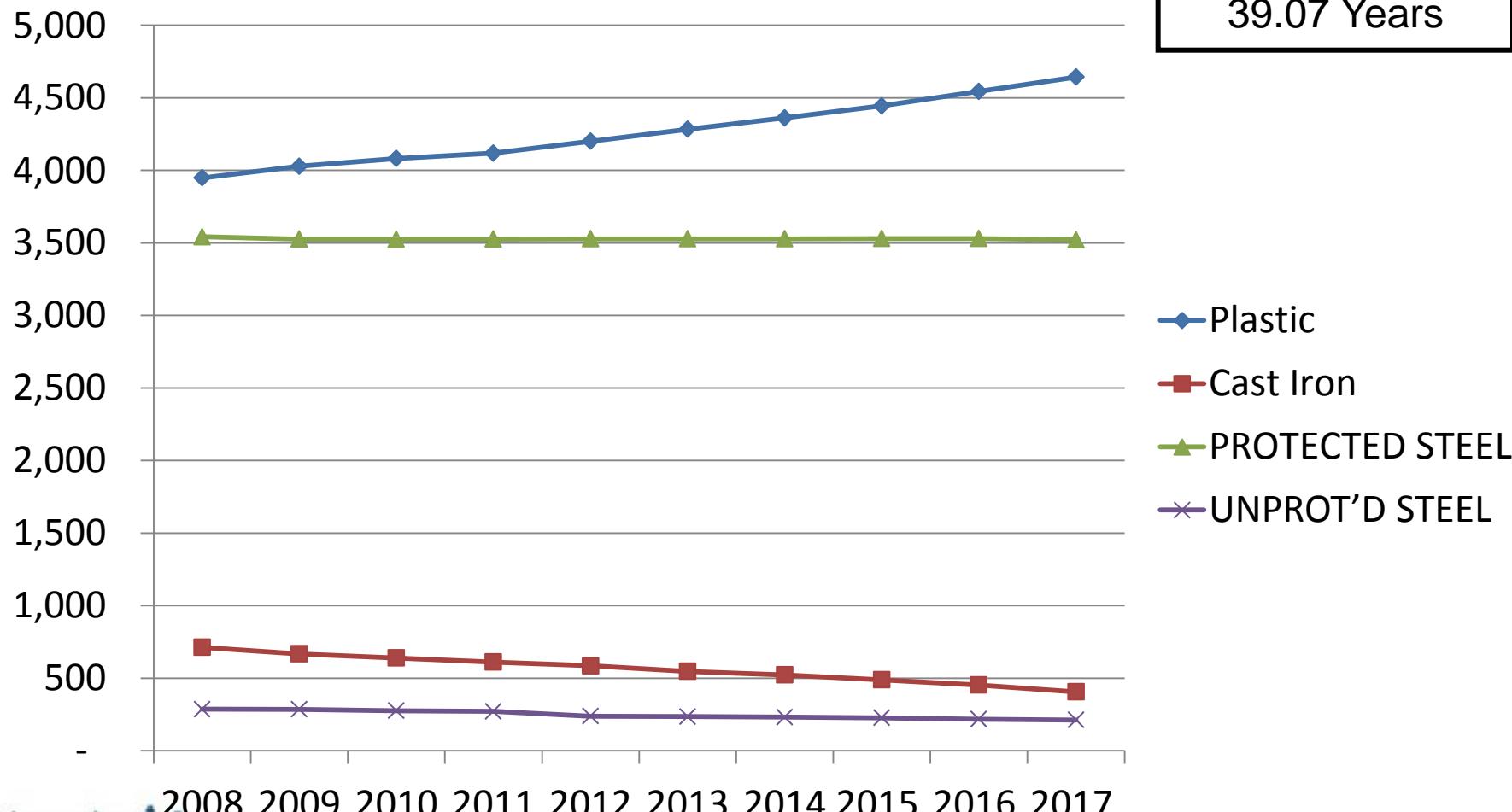


2017 SYSTEM INTEGRITY REPORT

UPSTATE

MAIN INVENTORY TREND (MILES)

Average Age
Of All Upstate
Distribution Main:
39.07 Years

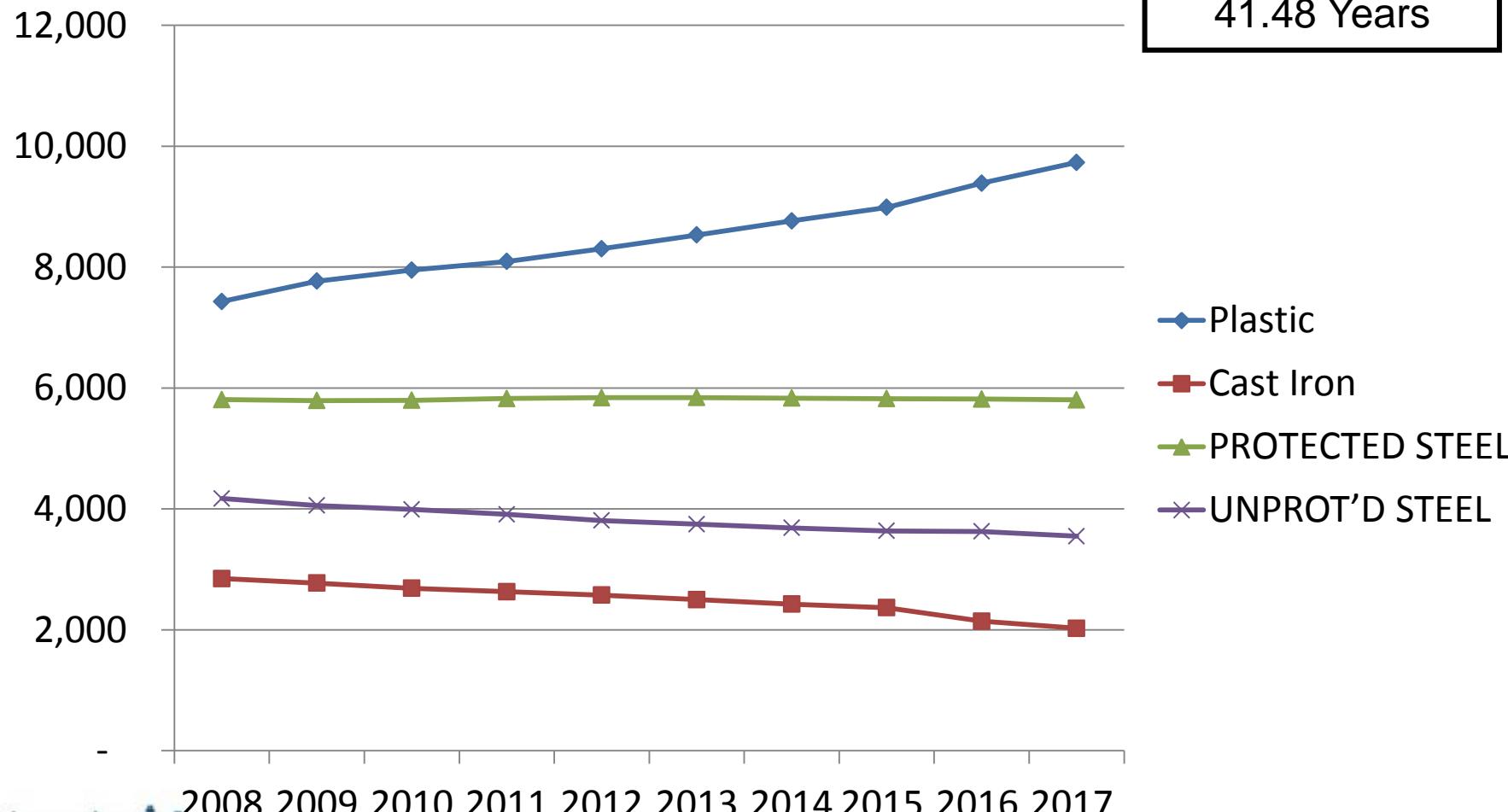


2017 SYSTEM INTEGRITY REPORT

NY STATE

MAIN INVENTORY TREND (MILES)

Average Age
Of All NY State
Distribution Main:
41.48 Years



nationalgrid

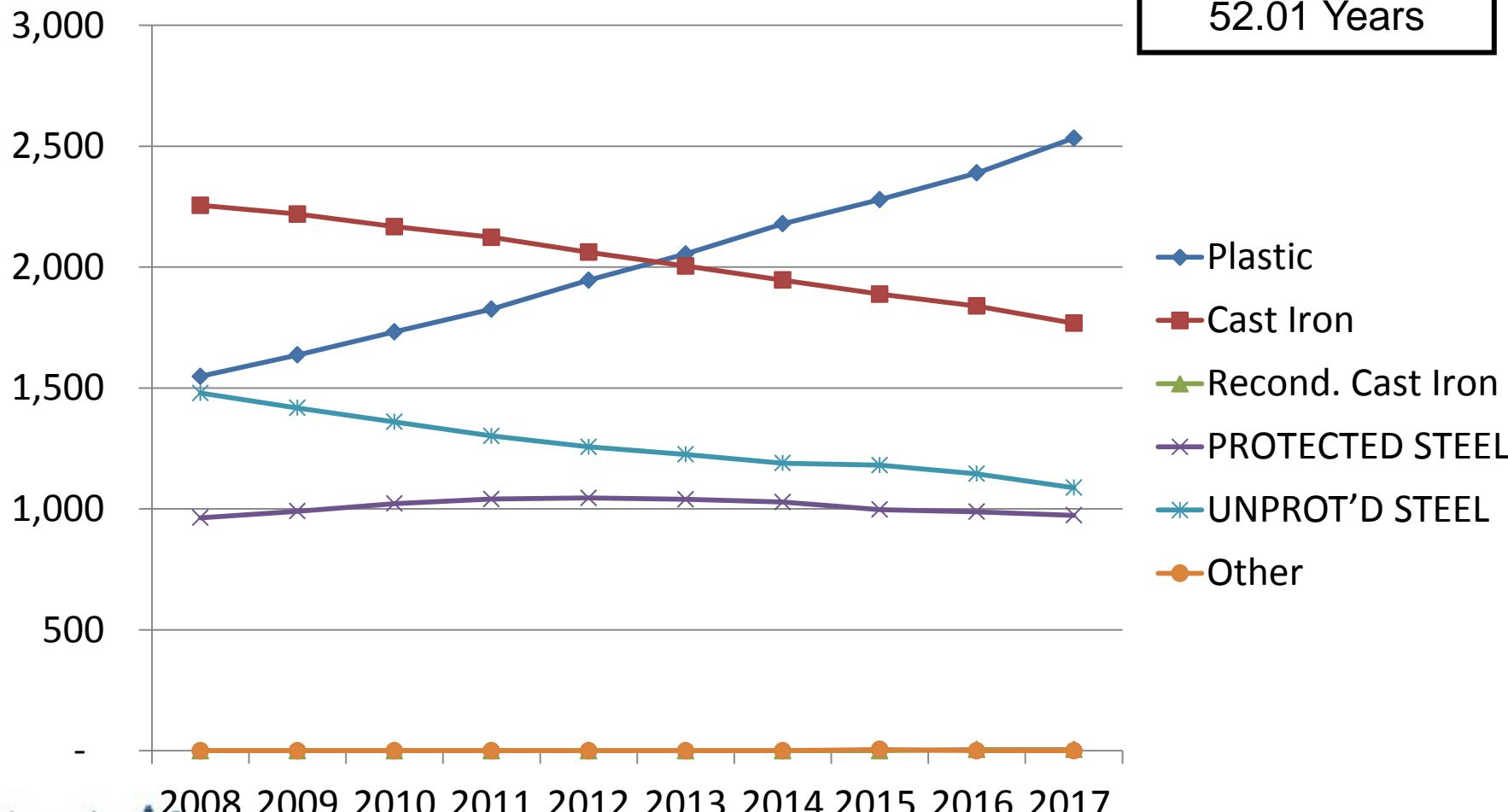
Note: See main breakdown in Appendix

2017 SYSTEM INTEGRITY REPORT

BGC

MAIN INVENTORY TREND (MILES)

Average Age
Of All BGC
Distribution Main:
52.01 Years

**nationalgrid**

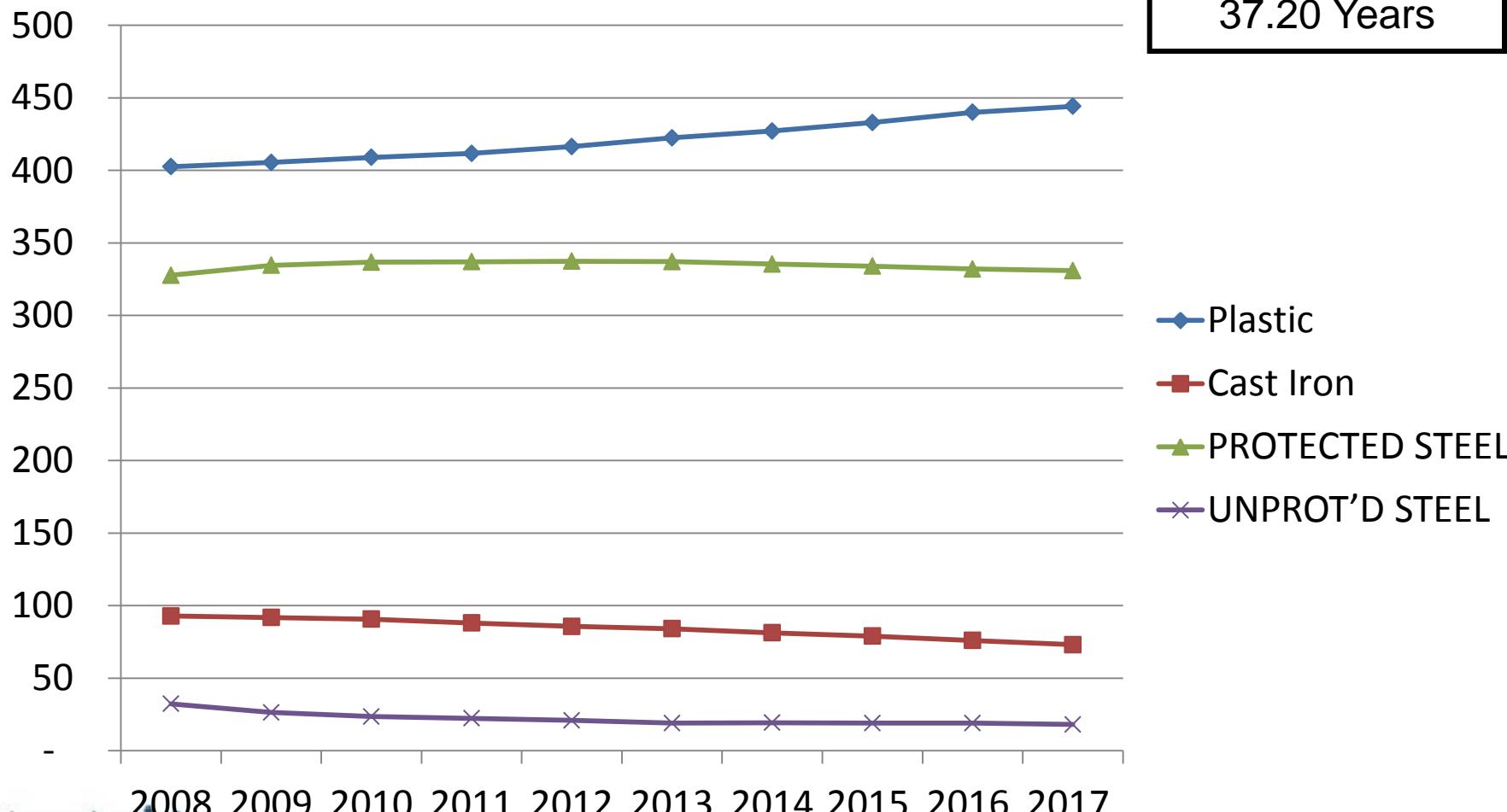
Note: See main breakdown in Appendix

2017 SYSTEM INTEGRITY REPORT

EGC

MAIN INVENTORY TREND (MILES)

Average Age
Of All EGC
Distribution Main:
37.20 Years

**nationalgrid**

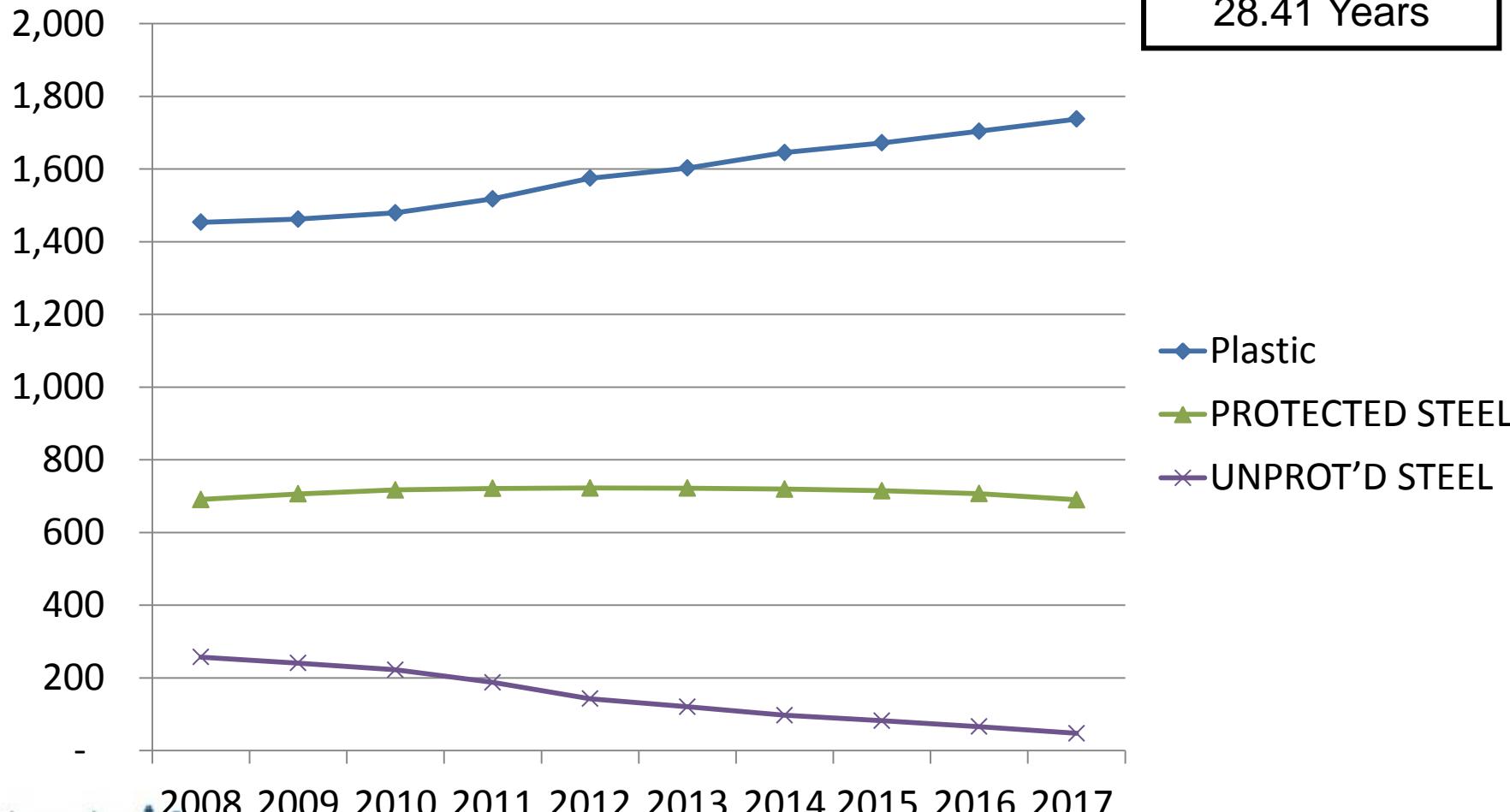
Note: See main breakdown in Appendix

2017 SYSTEM INTEGRITY REPORT

CAPE

MAIN INVENTORY TREND (MILES)

Average Age
Of All Cape
Distribution Main:
28.41 Years



nationalgrid

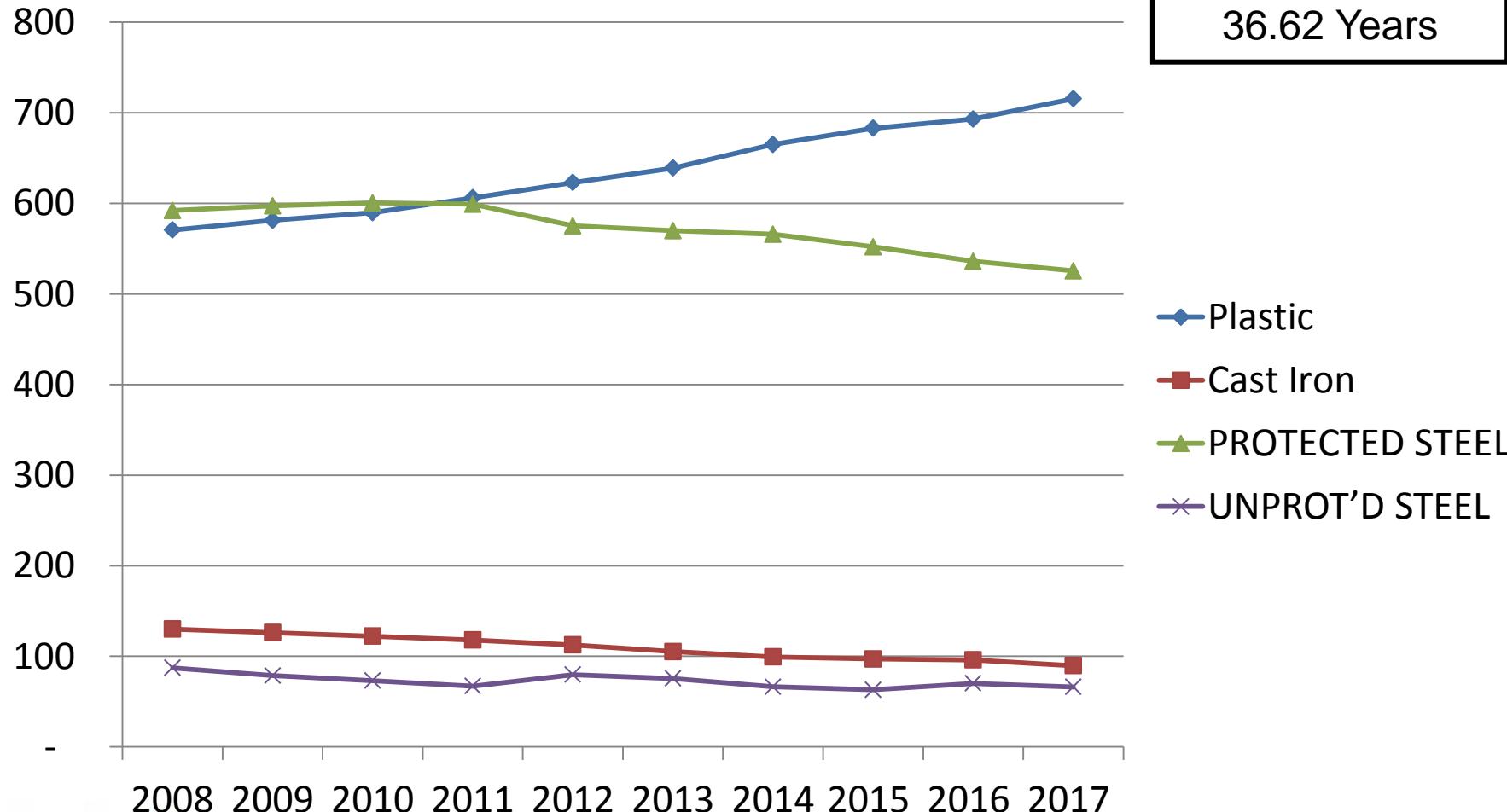
Note: See main breakdown in Appendix

2017 SYSTEM INTEGRITY REPORT

LOWELL

MAIN INVENTORY TREND (MILES)

Average Age
Of All Lowell
Distribution Main:
36.62 Years

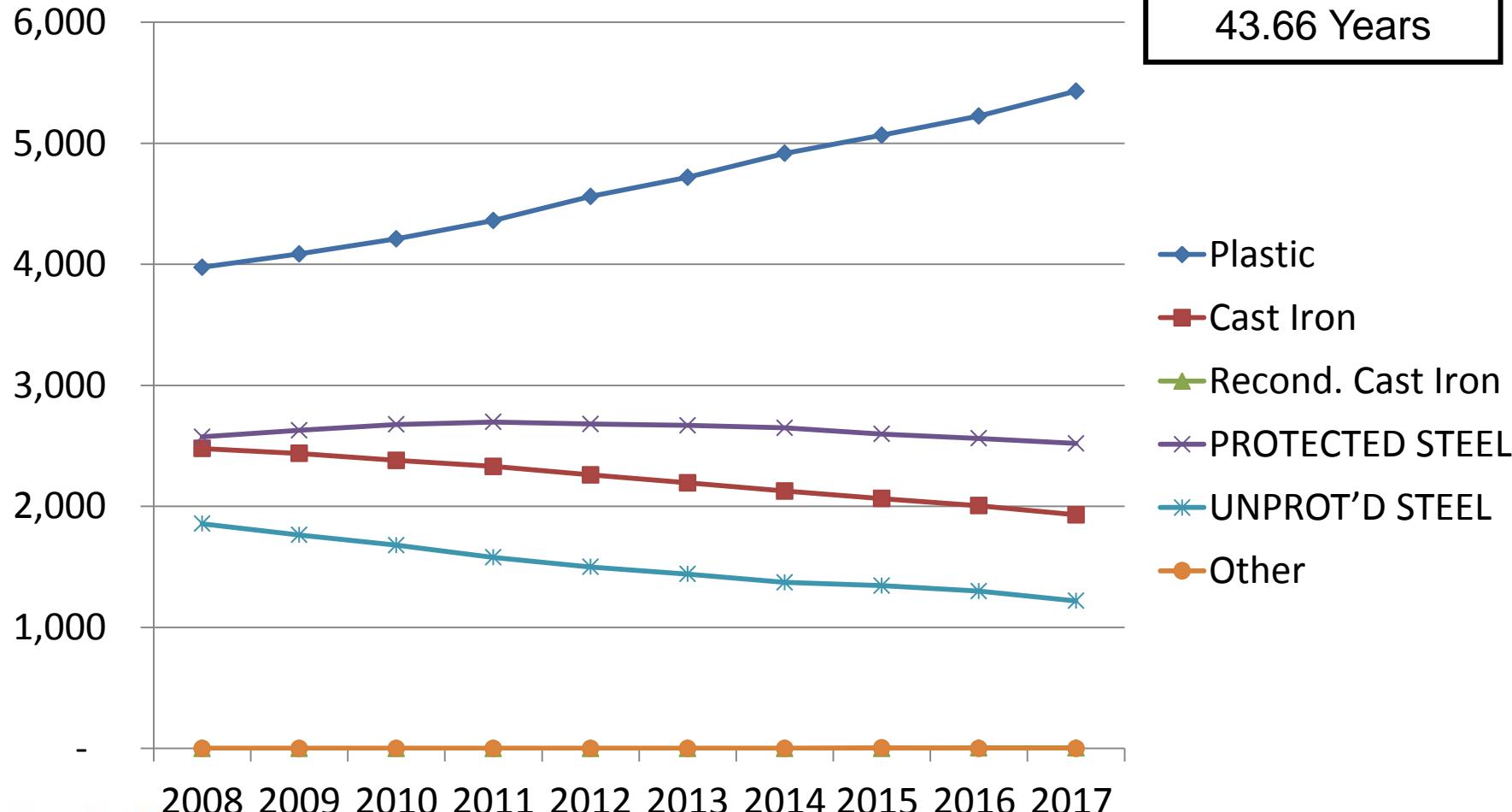


2017 SYSTEM INTEGRITY REPORT

MA

MAIN INVENTORY TREND (MILES)

Average Age
Of All MA
Distribution Main:
43.66 Years

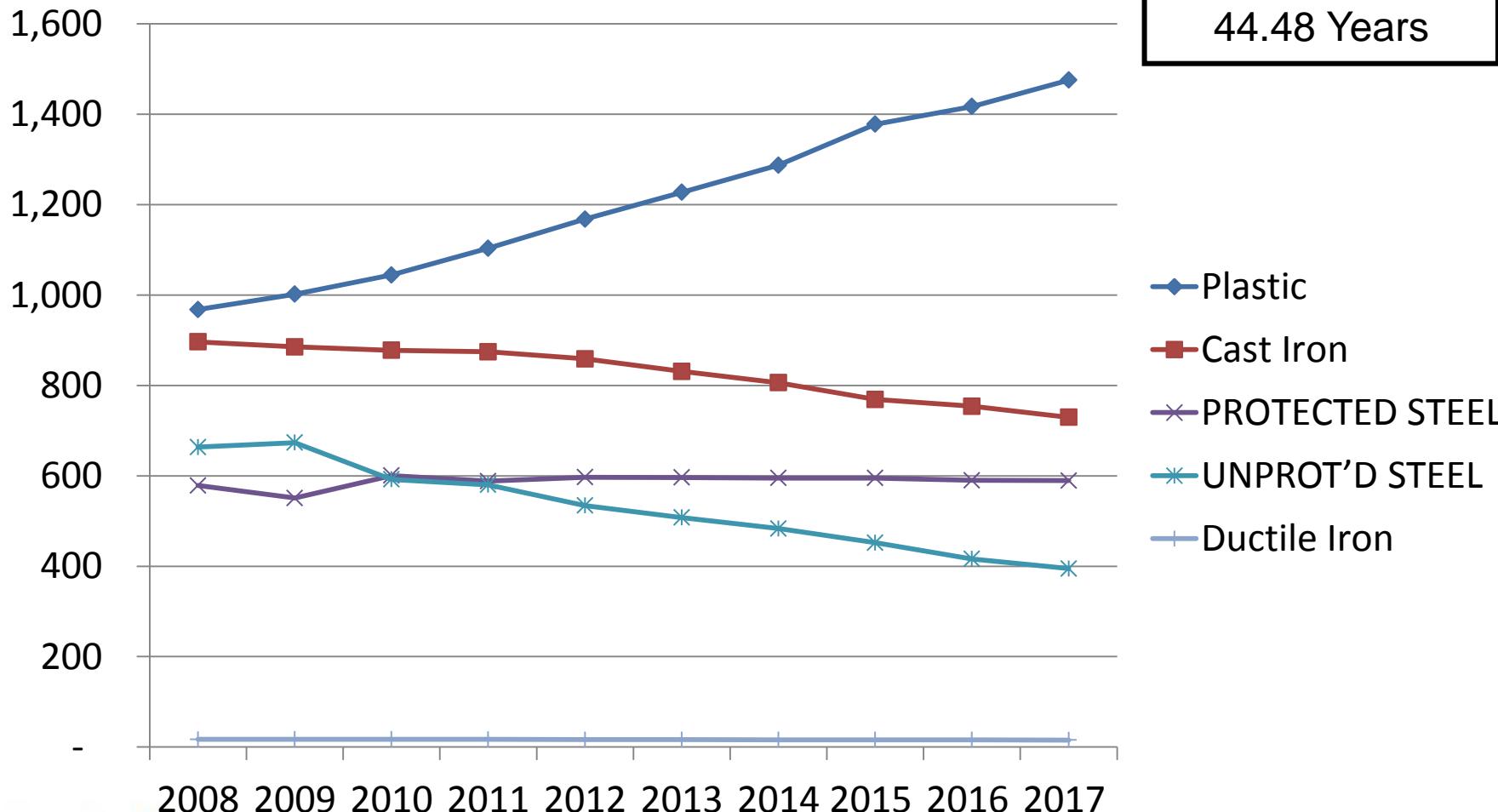


2017 SYSTEM INTEGRITY REPORT

RI

MAIN INVENTORY TREND (MILES)

Average Age
Of All RI
Distribution Main:
44.48 Years



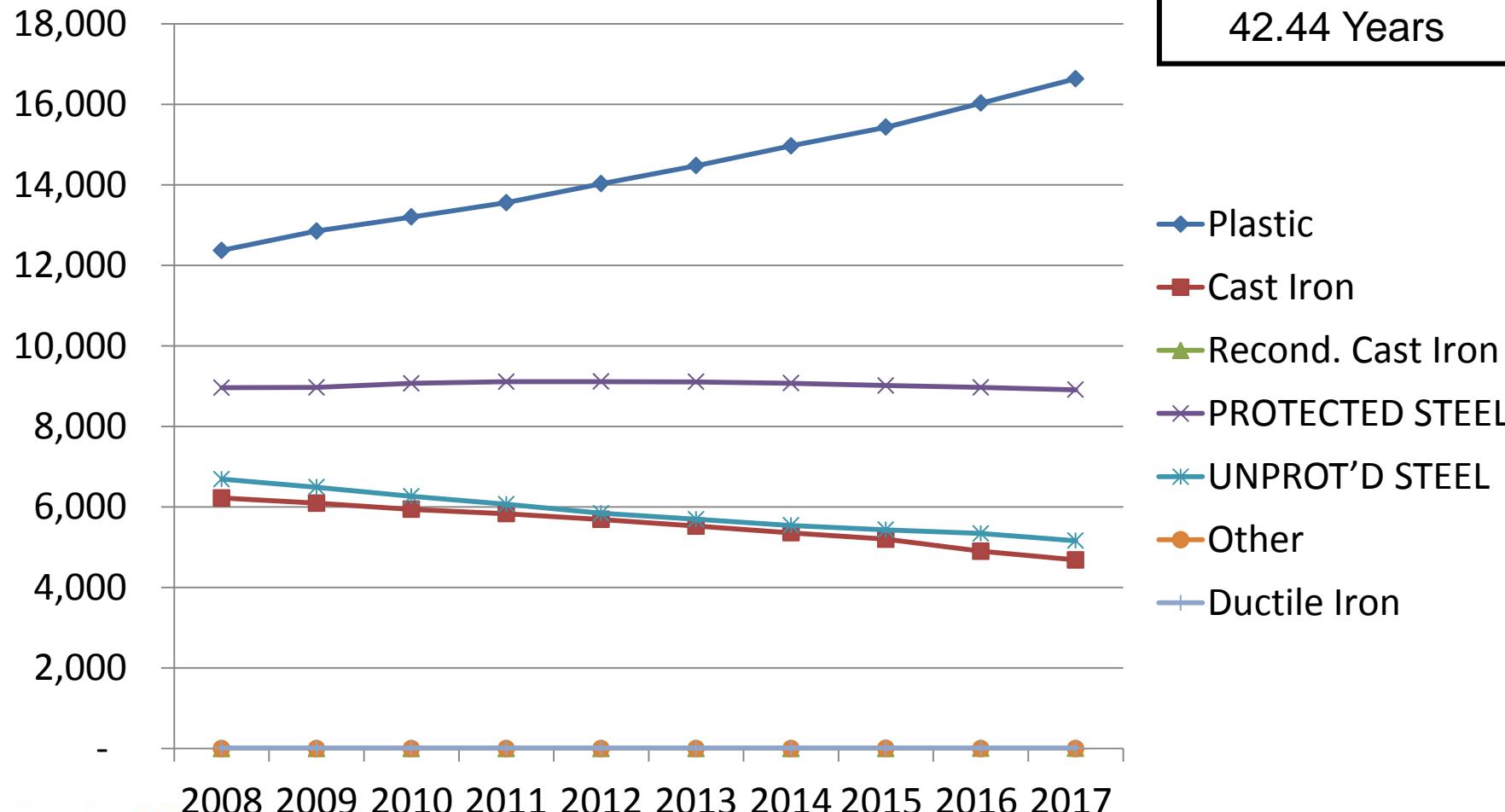
Note: See main breakdown in Appendix

nationalgrid

2017 SYSTEM INTEGRITY REPORT

US-NGrid

MAIN INVENTORY TREND (MILES)



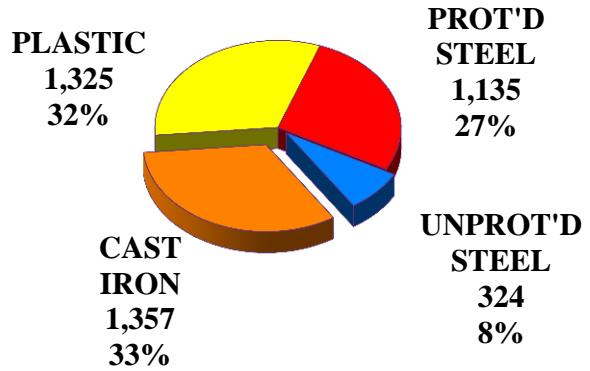
nationalgrid

Note: See main breakdown in Appendix

2017 SYSTEM INTEGRITY REPORT

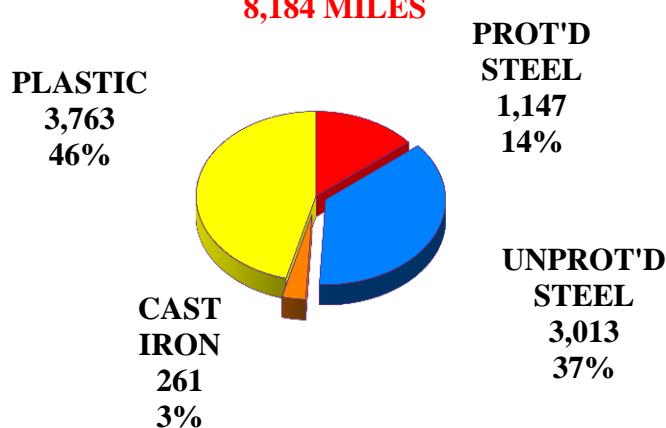
MAIN INVENTORY

New York City 4,141 MILES

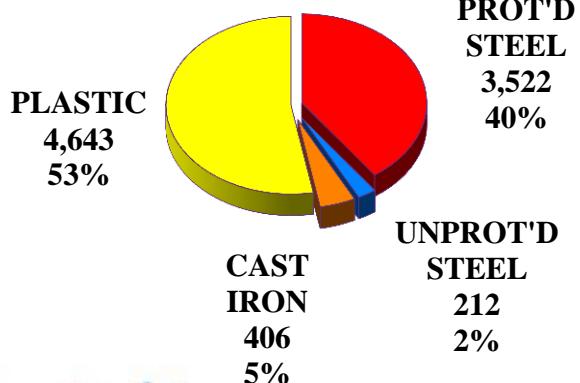


NEW YORK

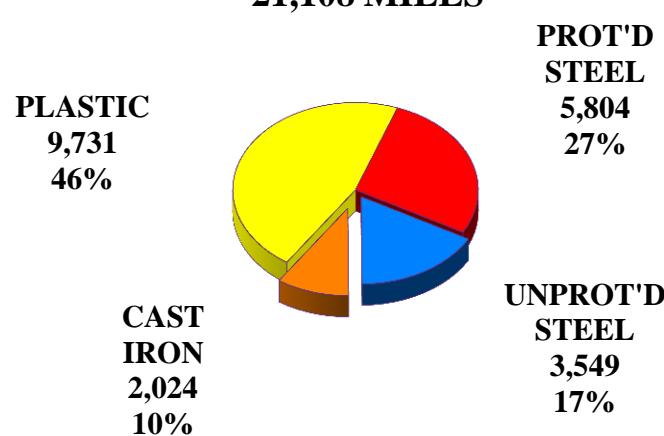
Long Island 8,184 MILES



Upstate 8,783 MILES



All New York State 21,108 MILES



2017 SYSTEM INTEGRITY REPORT

MAIN INVENTORY

MASSACHUSETTS

BGC

6,367 MILES

OTHER

5
0%



PROTD
STEEL

974
15%

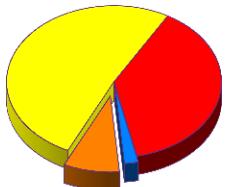
UNPROTD
STEEL
1,087
17%

CAST
IRON
1,768
28%

EGC

866 MILES

PLASTIC
444
51%



PROTD
STEEL
331
38%

CAST
IRON
73
8%

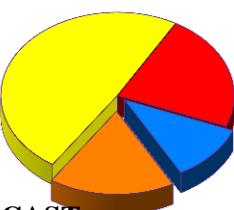
UNPROTD
STEEL
18
2%

All Massachusetts State
11,105 MILES

OTHER
5
0%

PLASTIC
5,431
49%

PROTD
STEEL
2,520
23%



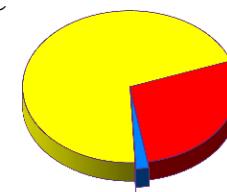
UNPROTD
STEEL
1,219
11%

Colonial Cape

2,475 MILES

PROTD
STEEL

690
28%



CAST
IRON
0
0%

UNPROTD
STEEL
48
2%

Colonial Lowell

1,397 MILES

PROTD
STEEL

526
38%



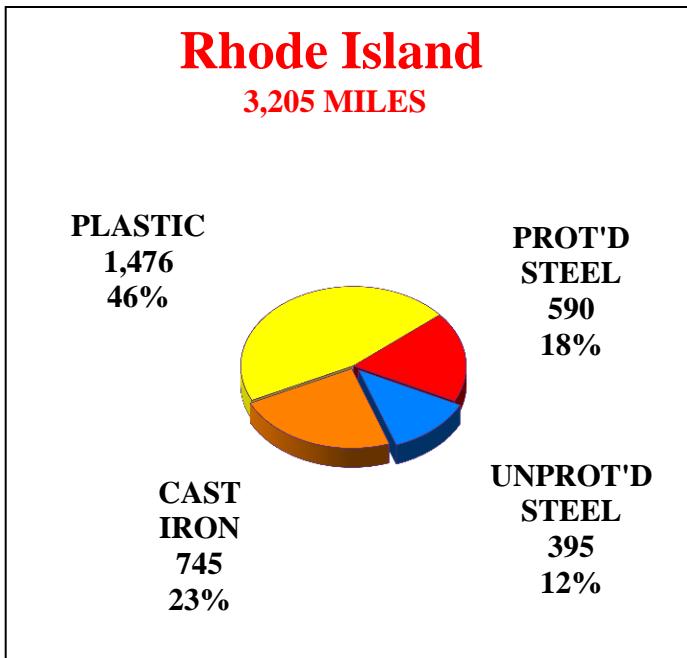
CAST
IRON
90
6%

UNPROTD
STEEL
77
5%

2017 SYSTEM INTEGRITY REPORT

MAIN INVENTORY

RI



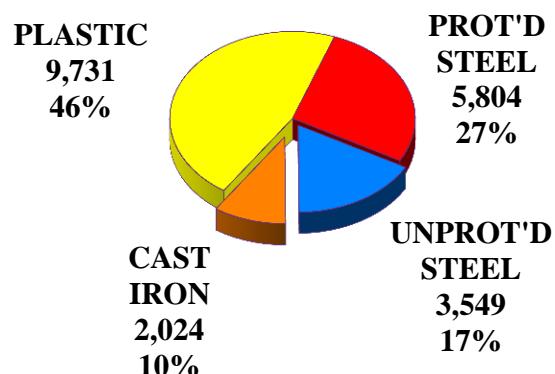
2017 SYSTEM INTEGRITY REPORT

MAIN INVENTORY

SUMMARY – All States

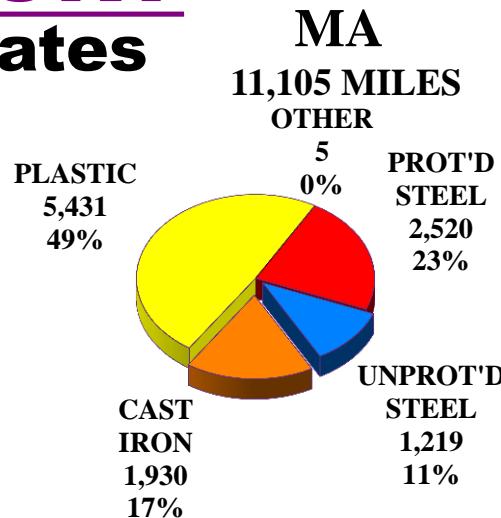
NY

21,108 MILES



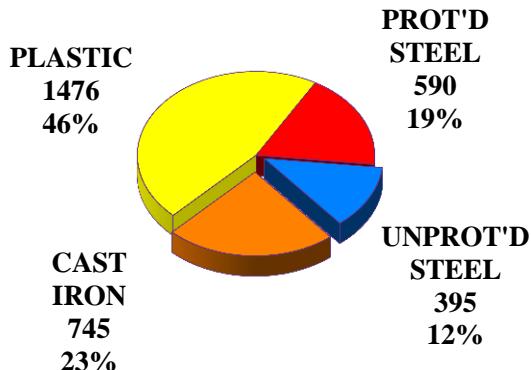
MA

11,105 MILES
OTHER



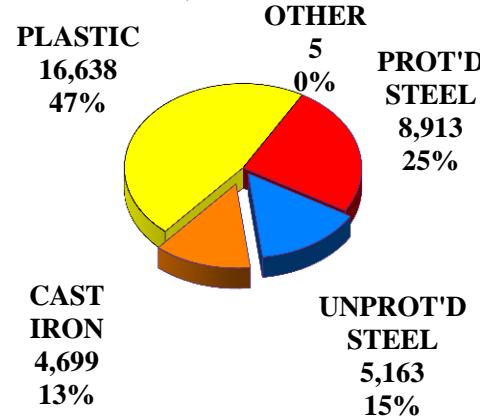
Rhode Island

3,205 MILES



National Grid-US

35,419 MILES



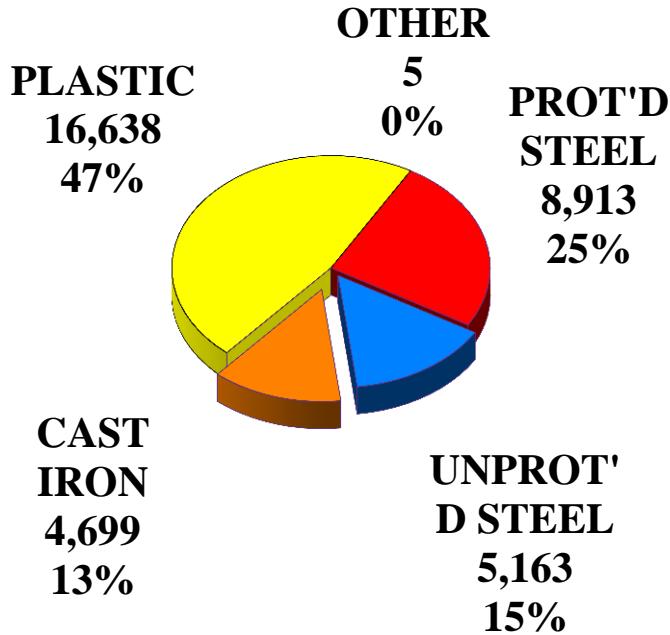
2017 SYSTEM INTEGRITY REPORT

2017 MAIN INVENTORY

U.S. COMPARATIVE SUMMARY

National Grid - US

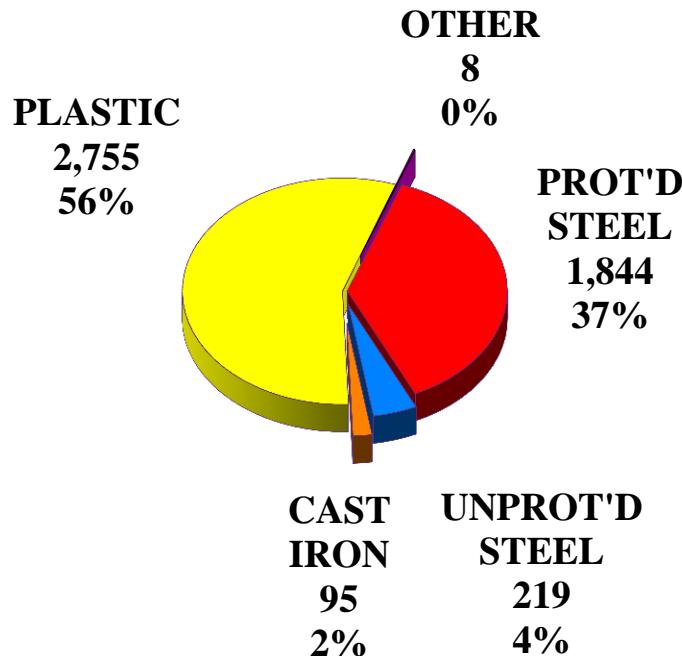
35,419 MILES



2017 PHMSA Average

237 Companies with 500+ miles

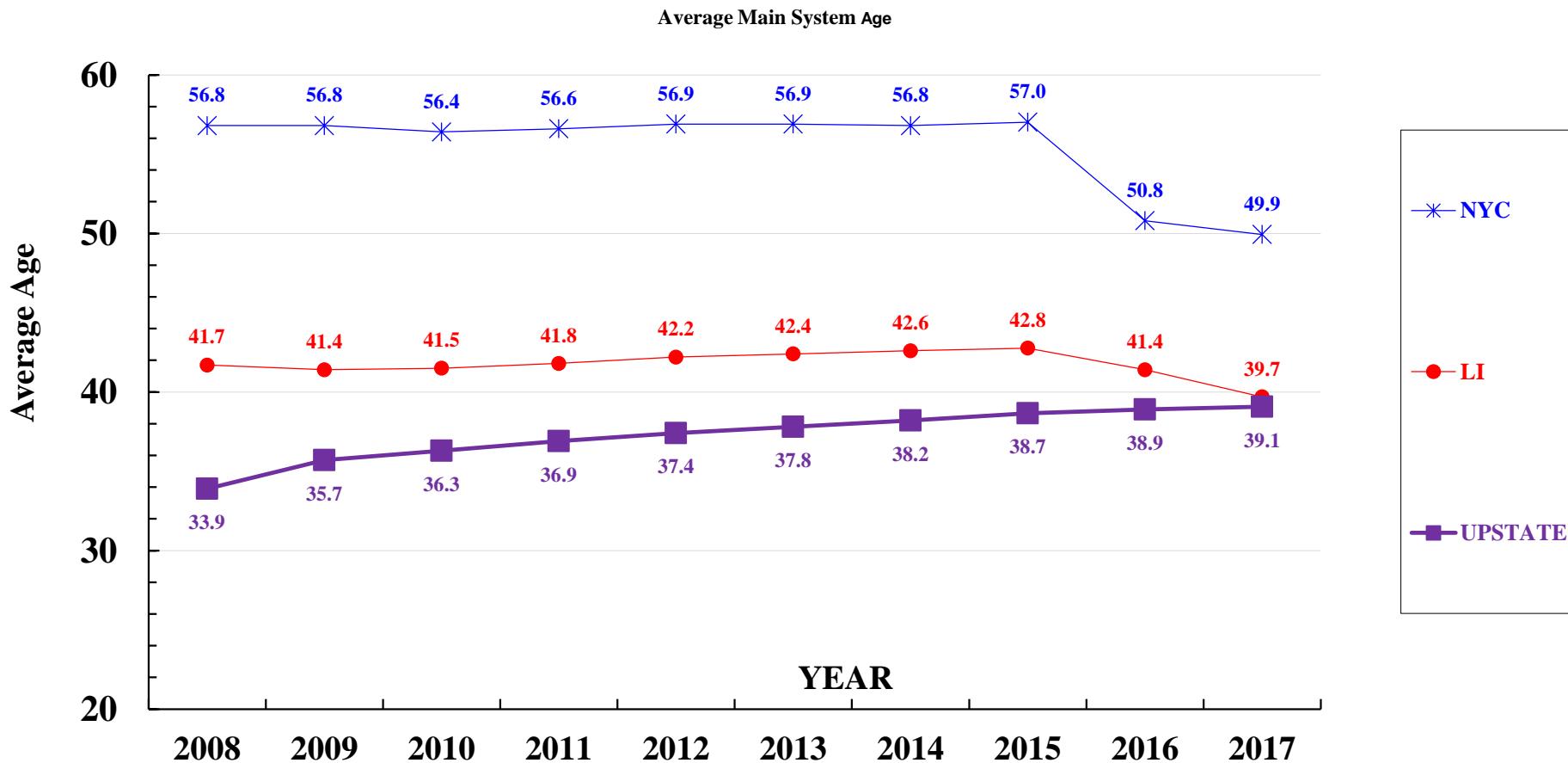
4,921 MILES



Excluding National Grid miles of main

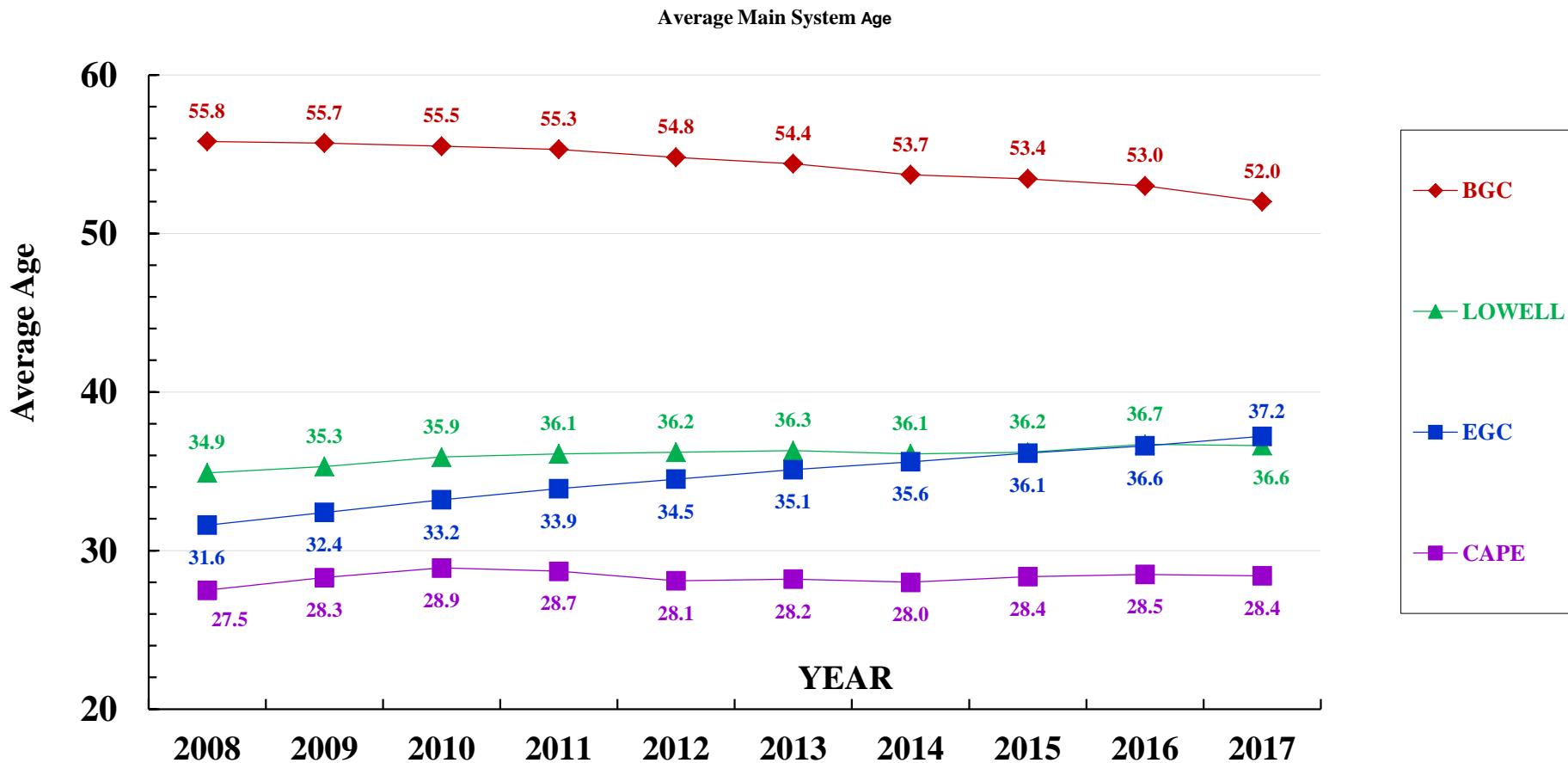
2017 SYSTEM INTEGRITY REPORT

National Grid Gas Distribution System
Average Age of Main by Legacy NG Company Reflects Expected Northeast Pattern(i.e., old civilization areas and cast iron)



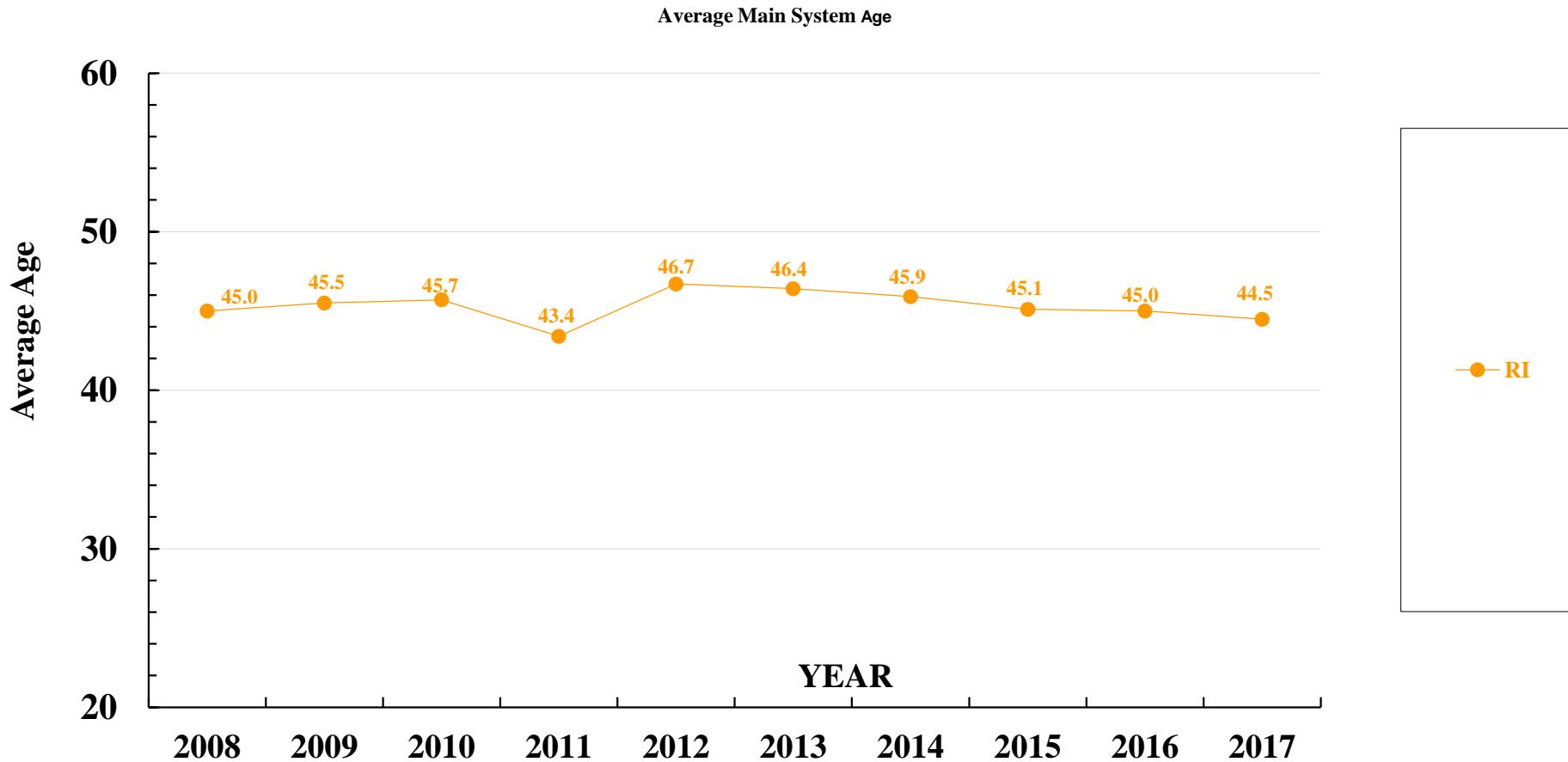
2017 SYSTEM INTEGRITY REPORT

National Grid Gas Distribution System
Average Age of Main by Legacy NG Company Reflects Expected Northeast Pattern(i.e., old civilization areas and cast iron)



2017 SYSTEM INTEGRITY REPORT

National Grid Gas Distribution System
Average Age of Main by Legacy NG Company Reflects Expected
Northeast Pattern(i.e., old civilization areas and cast iron)



2017 SYSTEM INTEGRITY REPORT

NATIONAL GRID MAIN REPLACEMENT

Rate Case Supported “Leak-Prone” Main Replacement Levels

Region	2017 Total Main (Miles)	2017 Leak Prone Main (Miles)	Leaks/Miles of Total Main (Repair rate)	Leaks/Miles of Leak Prone Main (Repair rate)	⁽⁵⁾ 2017 Annual "Planned" Replacement (Miles)	Planned Replacement % of Leak prone system	⁽⁵⁾ 2017 Annual "Actual" Replacement (Miles)	Actual Replacement % of Leak prone system	⁽⁵⁾ 2018 Annual "Planned" Replacement (Miles)	Years to LPP Main Elimination based on "Current" annual plan
NYC	4,141	1,681	0.77	1.85	55.0	3.3%	57.1	3.4%	58.0	18
LI	8,184	3,274	0.12	0.28	115.0	3.5%	115.9	3.5%	135.0	18
Upstate NY	8,783	618	0.06	0.72	52.6	8.5%	53.8	8.7%	50.0	13
RI	3,205	1,124	0.26	0.73	53.7	4.8%	53.6	4.8%	60.0	18
BGC & EGC	7,233	2,946	0.98	2.16	116.0	3.9%	121.2	4.1%	115.0	22
CCC & CLW	3,872	203	0.07	0.84	43.0	21.1%	44.7	22.0%	40.0	9

Note:

1. Leaks per mile of total main excludes Excavation leaks.
2. Leaks per mile of Leak-Prone main (LPP) excludes Excavation leaks and Plastic leaks.
3. Leak-Prone Pipe = Unprotected steel (Bare & Coated) + CI/WI + Aldyl-A (MD, 1985 and prior) + Other.
4. Miles of Leak-Prone main replaced includes all Proactive programs (Main Replacement program & System Reinforcement) and all Reactive programs (Public Works, Water Intrusion & Leak/reactive).
5. Annual planned and actual replacement miles are CY.
6. Data sources are 2016 & 2017 US Gas Leak Prone Pipe Replacement Programs monthly reports from Gas Resource Management CMS.

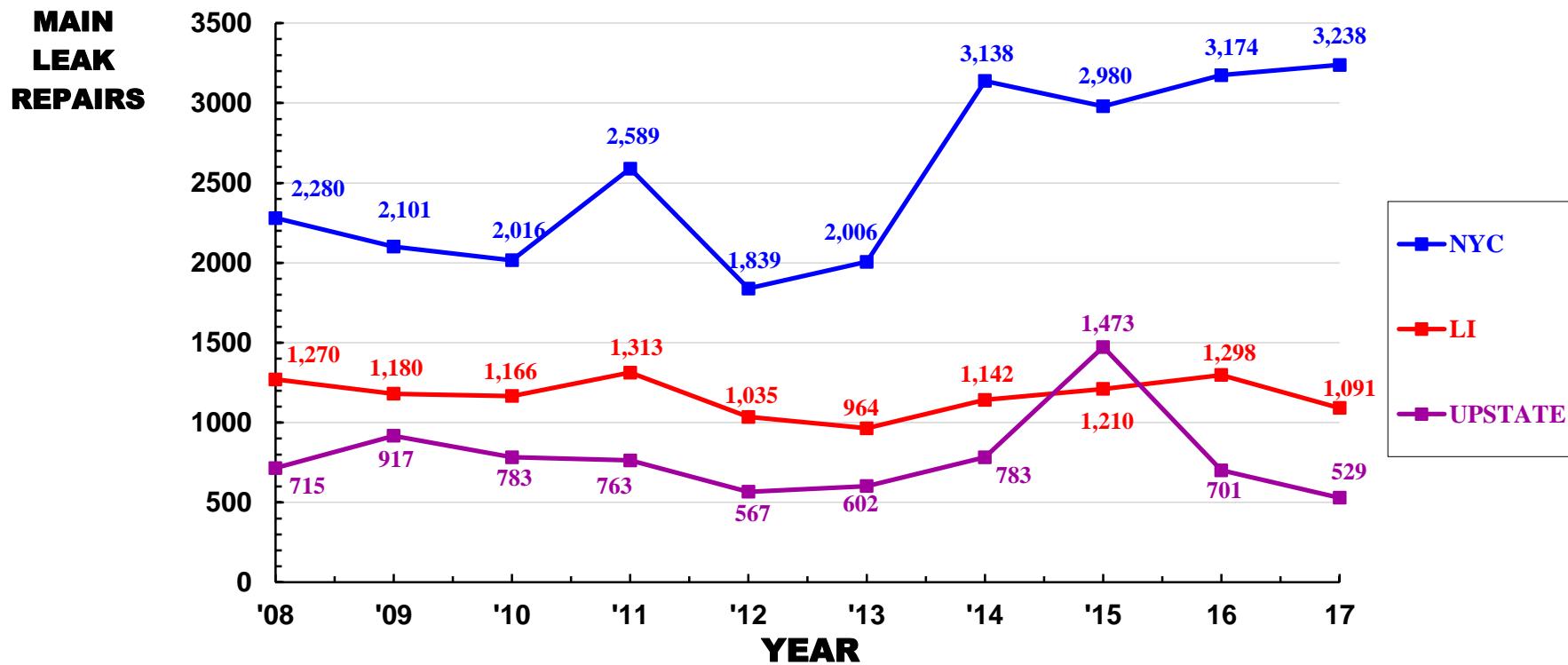
2017 SYSTEM INTEGRITY REPORT

MAIN LEAK REPAIR ANALYSIS

2017 SYSTEM INTEGRITY REPORT

TOTAL MAIN LEAK REPAIRS

INCLUDING Damages

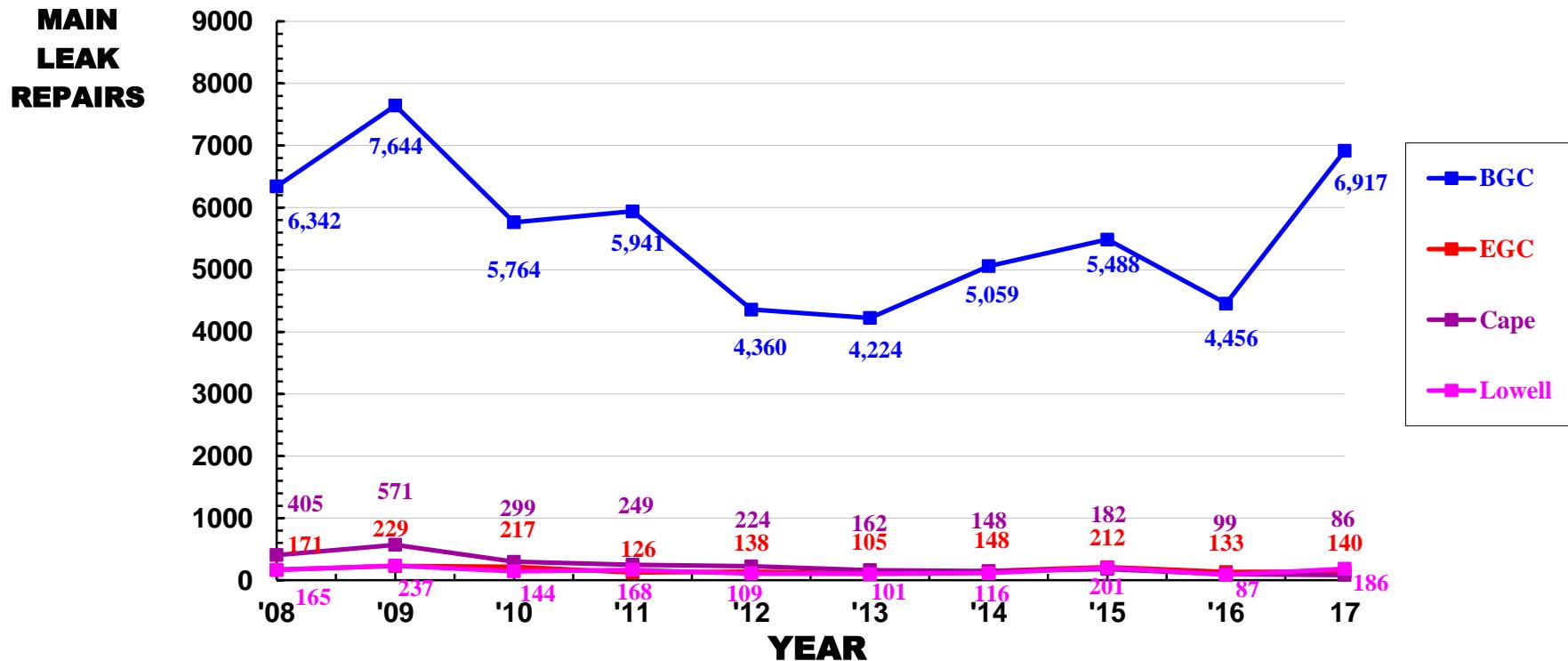


NOTE: Cast Iron Leak Count Total Individual Joint Repairs

2017 SYSTEM INTEGRITY REPORT

TOTAL MAIN LEAK REPAIRS

INCLUDING Damages

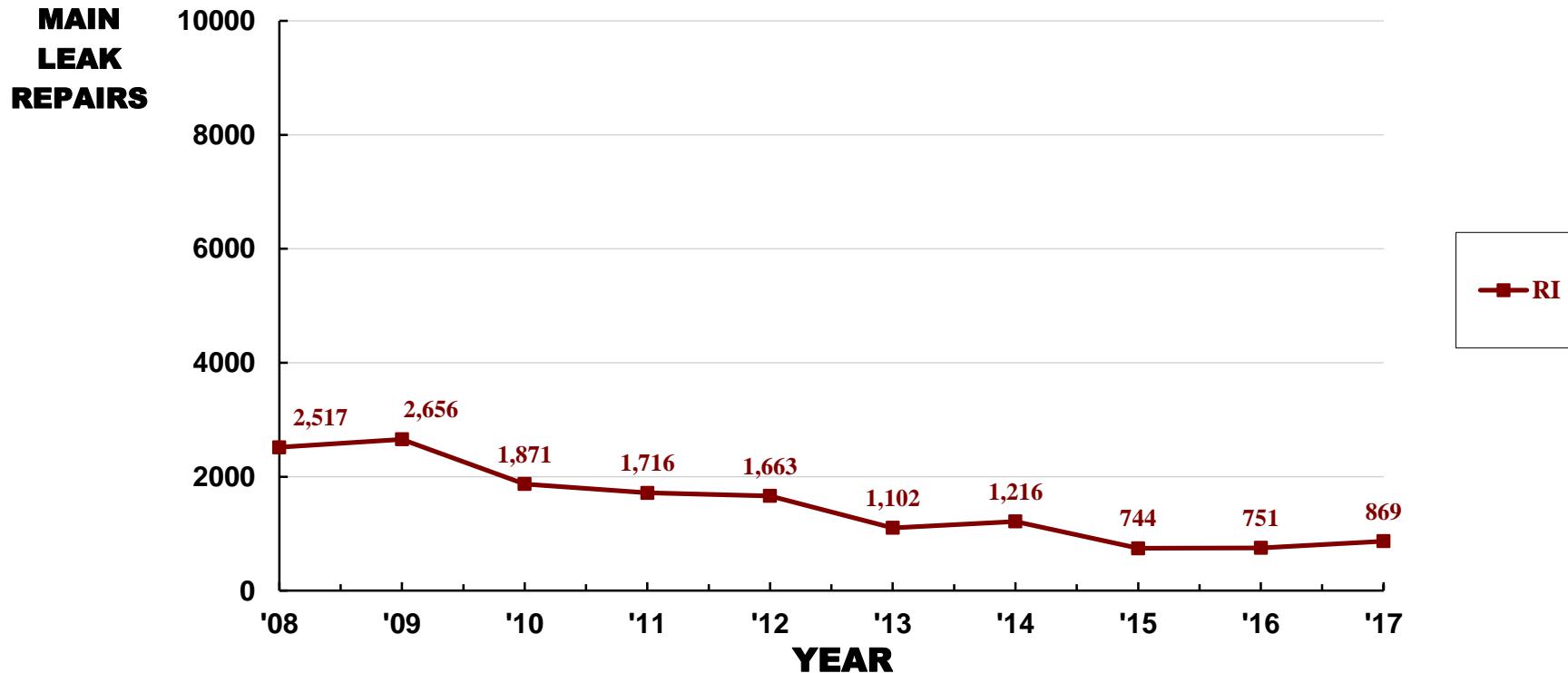


NOTE: Cast Iron Leaks Count Total Individual Joint Repairs

2017 SYSTEM INTEGRITY REPORT

TOTAL MAIN LEAK REPAIRS

INCLUDING Damages

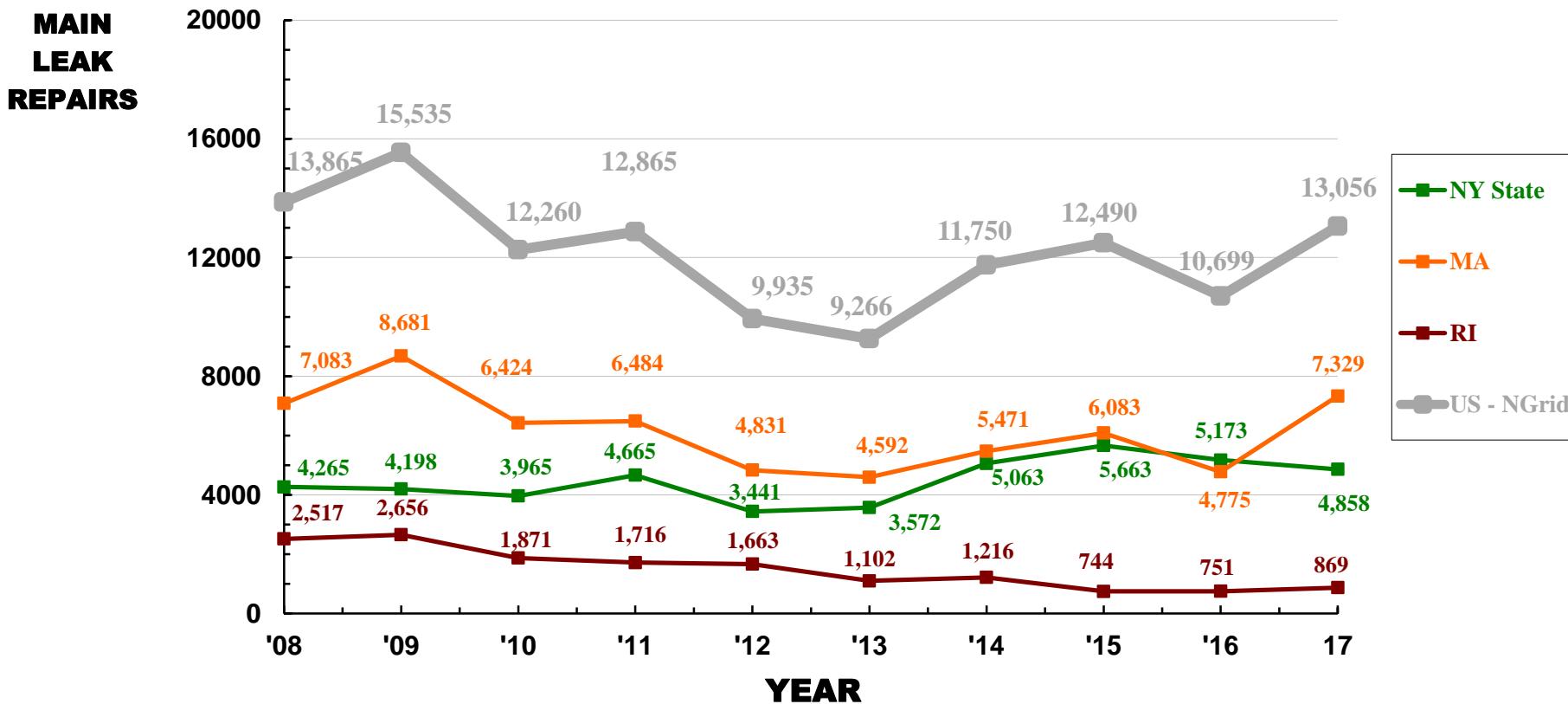


NOTE: Cast Iron Leaks Count Total Individual Joint Repairs

2017 SYSTEM INTEGRITY REPORT

TOTAL MAIN LEAK REPAIRS

INCLUDING Damages



NOTE: Cast Iron Leaks Count Total Individual Joint Repairs

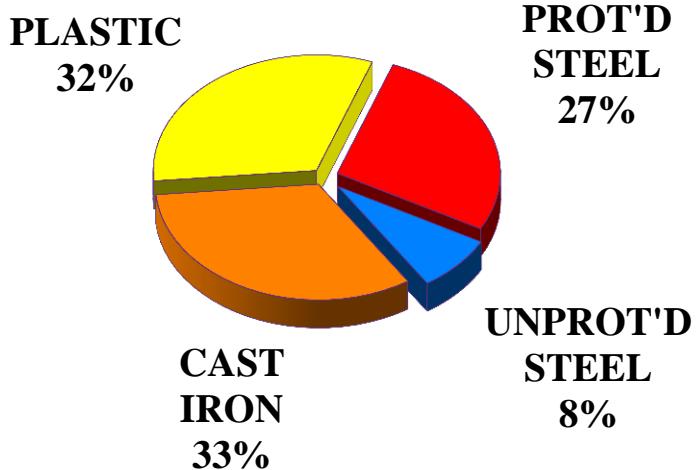
2017 SYSTEM INTEGRITY REPORT

NYC

TOTAL MAIN INVENTORY COMPARED TO LEAK REPAIRS

TOTAL MAIN INVENTORY BY MATERIAL

4,141 MILES



TOTAL MAIN LEAK REPAIRS BY MATERIAL

3,238 LEAKS (including damages)



NOTE: Each Repair is Counted as an Individual Leak.

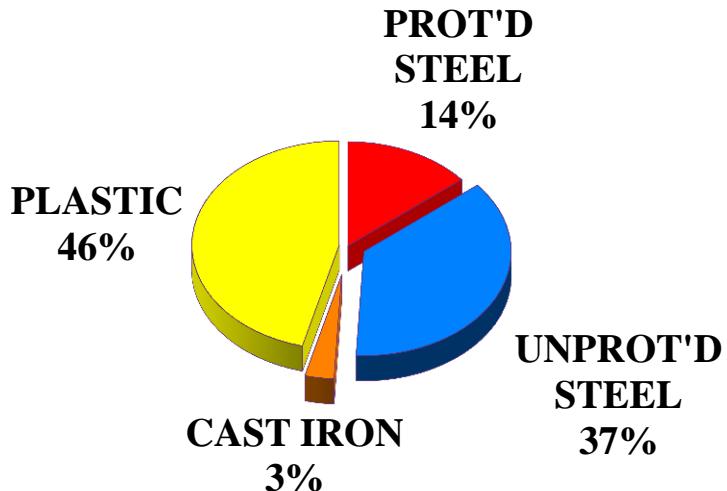
2017 SYSTEM INTEGRITY REPORT

LI

TOTAL MAIN INVENTORY COMPARED TO LEAK REPAIRS

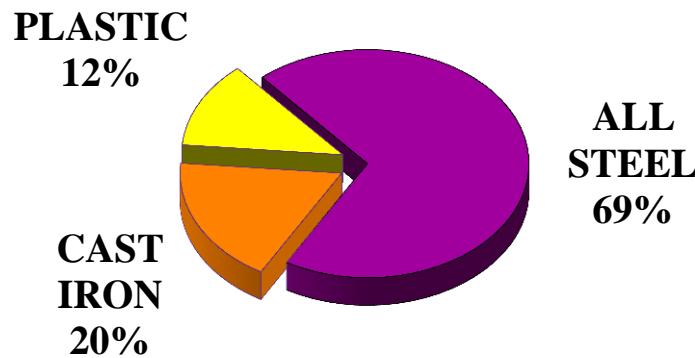
TOTAL MAIN INVENTORY BY MATERIAL

8,184 MILES



TOTAL MAIN LEAK REPAIRS BY MATERIAL

1,091 LEAKS (including damages)



NOTE: Each Repair is Counted as an Individual Leak.

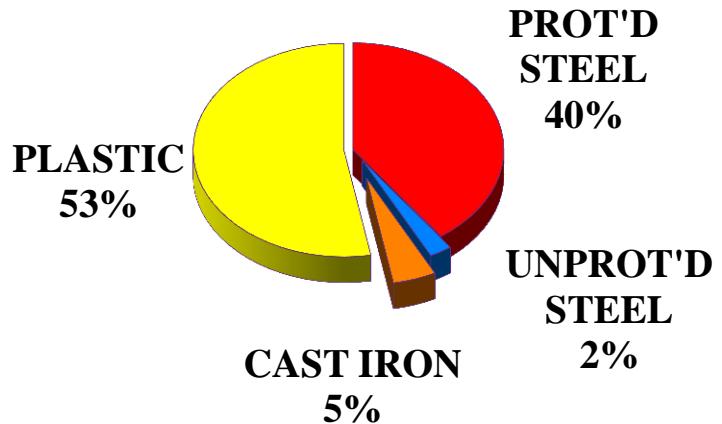
2017 SYSTEM INTEGRITY REPORT

UPSTATE

TOTAL MAIN INVENTORY COMPARED TO LEAK REPAIRS

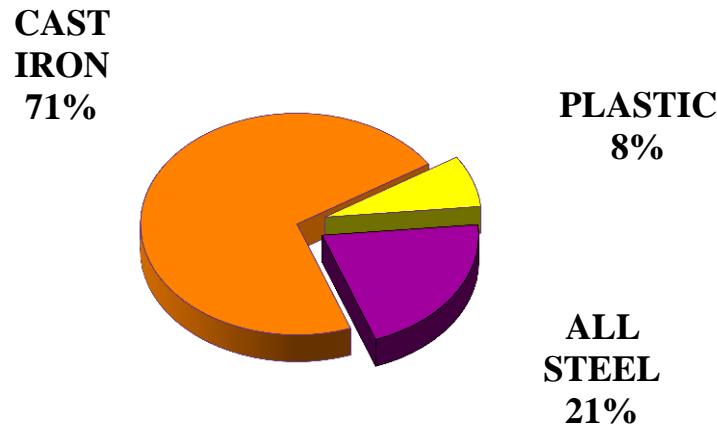
TOTAL MAIN INVENTORY BY MATERIAL

8,783 MILES



TOTAL MAIN LEAK REPAIRS BY MATERIAL

701 LEAKS (including damages)



NOTE: Each Repair is Counted as an Individual Leak.

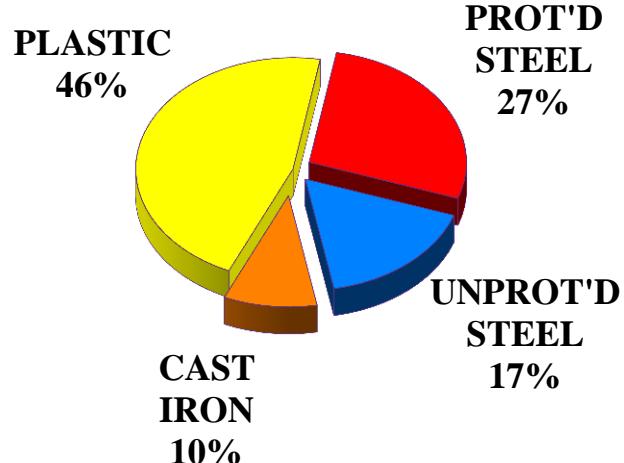
2017 SYSTEM INTEGRITY REPORT

NY State

TOTAL MAIN INVENTORY COMPARED TO LEAK REPAIRS

TOTAL MAIN INVENTORY BY MATERIAL

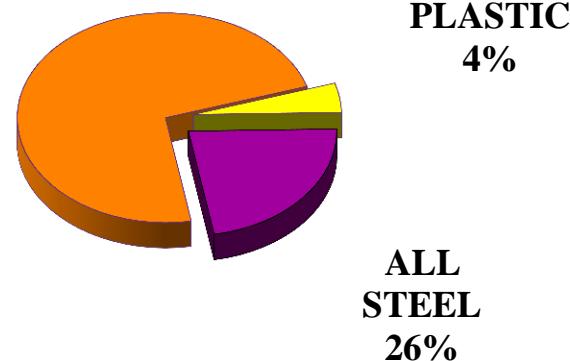
21,108 MILES



TOTAL MAIN LEAK REPAIRS BY MATERIAL

4,858 LEAKS (including damages)

CAST
IRON
69%



NOTE: Each Repair is Counted as an Individual Leak.

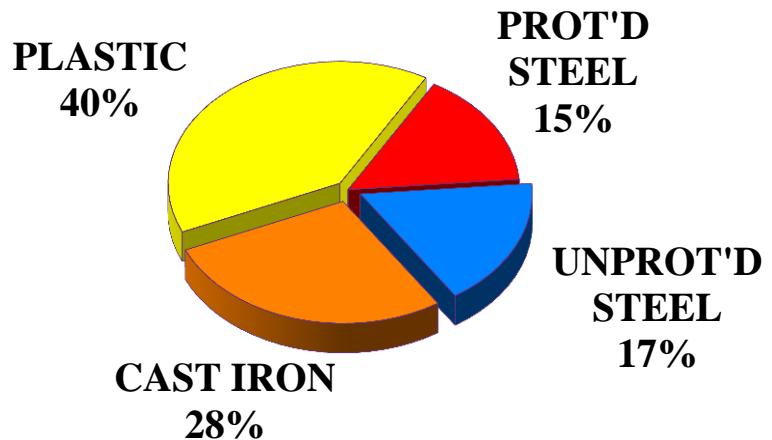
2017 SYSTEM INTEGRITY REPORT

BGC

TOTAL MAIN INVENTORY COMPARED TO LEAK REPAIRS

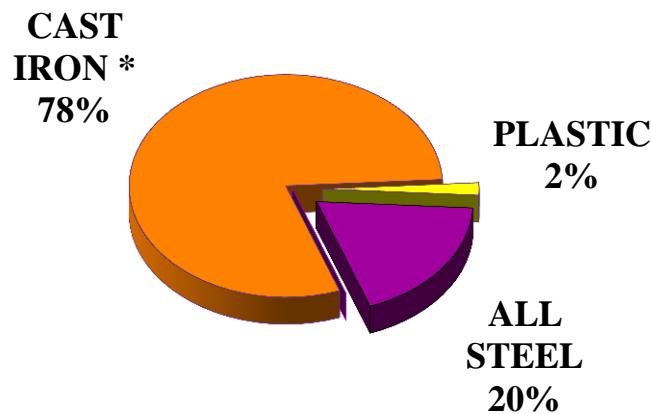
TOTAL MAIN INVENTORY BY MATERIAL

6,367 MILES



TOTAL MAIN LEAK REPAIRS BY MATERIAL

6,917 LEAKS (including damages)



NOTE: (*) CI Leaks include WI & Other material Leaks.
Each Repair is Counted as an Individual Leak.

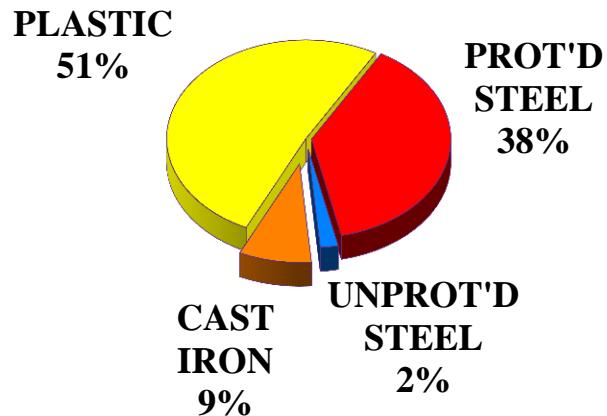
2017 SYSTEM INTEGRITY REPORT

EGC

TOTAL MAIN INVENTORY COMPARED TO LEAK REPAIRS

TOTAL MAIN INVENTORY BY MATERIAL

866 MILES



TOTAL MAIN LEAK REPAIRS BY MATERIAL

140 LEAKS (including damages)



NOTE: (*) CI Leaks include WI material Leaks.
Leak Count Totals Individual Repairs.

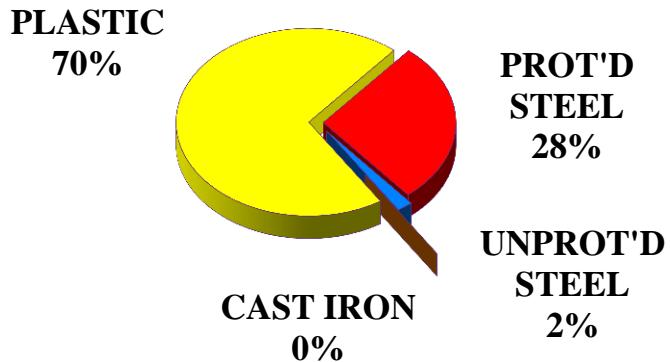
2017 SYSTEM INTEGRITY REPORT

Cape

TOTAL MAIN INVENTORY COMPARED TO LEAK REPAIRS

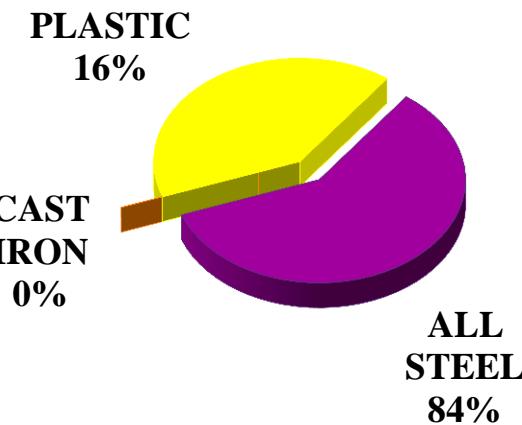
TOTAL MAIN INVENTORY BY MATERIAL

2,475 MILES



TOTAL MAIN LEAK REPAIRS BY MATERIAL

86 LEAKS (including damages)



NOTE: Leak Count Totals Individual Repairs

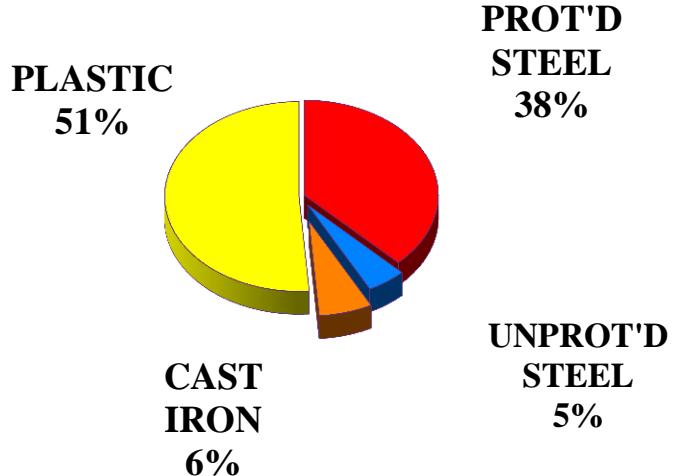
2017 SYSTEM INTEGRITY REPORT

Lowell

TOTAL MAIN INVENTORY COMPARED TO LEAK REPAIRS

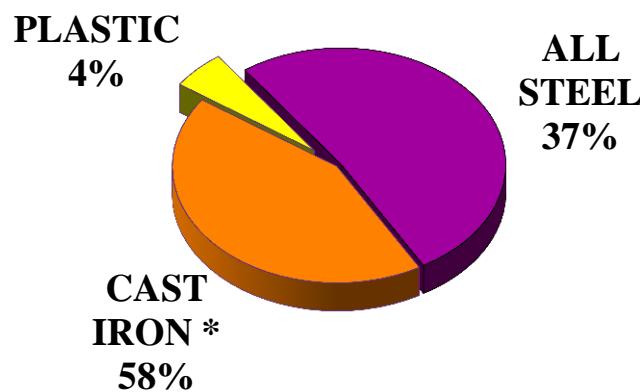
TOTAL MAIN INVENTORY BY MATERIAL

1,397 MILES



TOTAL MAIN LEAK REPAIRS BY MATERIAL

180 LEAKS (including damages)



NOTE: (*) CI Leaks include WI material Leaks.
Leak Count Totals Individual Repairs.

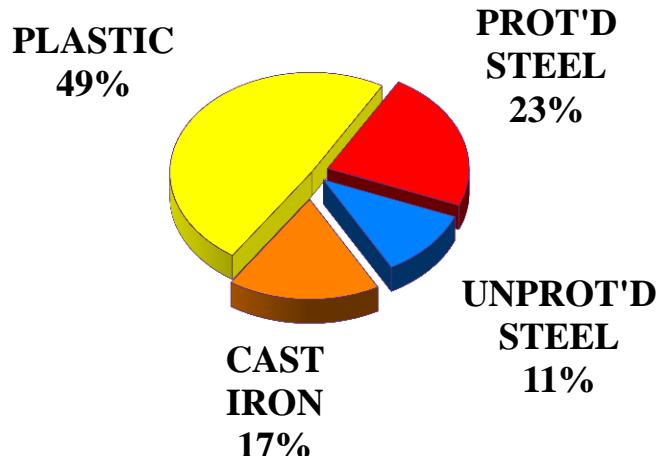
2017 SYSTEM INTEGRITY REPORT

MA

TOTAL MAIN INVENTORY COMPARED TO LEAK REPAIRS

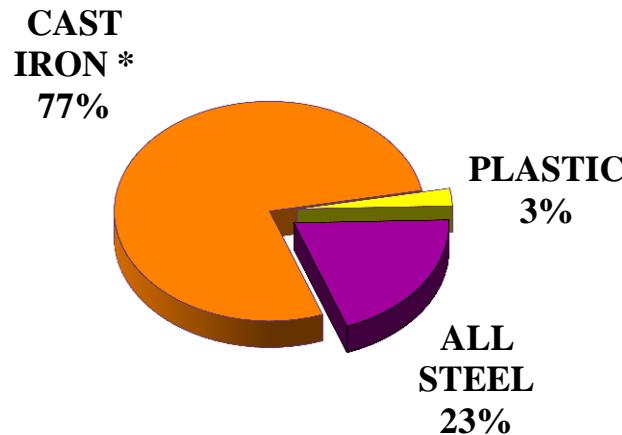
TOTAL MAIN INVENTORY BY MATERIAL

11,105 MILES



TOTAL MAIN LEAK REPAIRS BY MATERIAL

7,329 LEAKS (including damages)



NOTE: (*) CI Leaks include WI & Other material Leaks.
Leak Count Totals Individual Repairs.

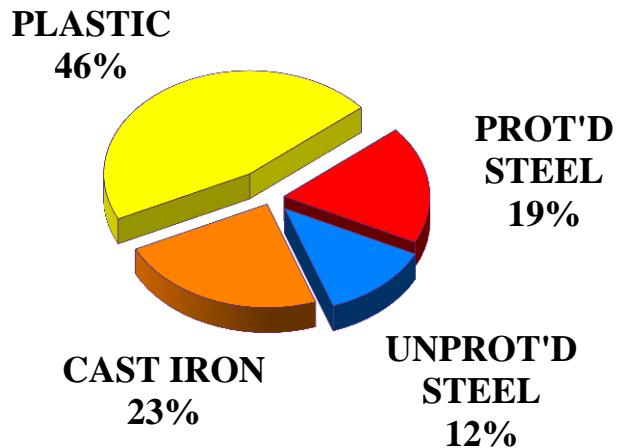
2017 SYSTEM INTEGRITY REPORT

RI

TOTAL MAIN INVENTORY COMPARED TO LEAK REPAIRS

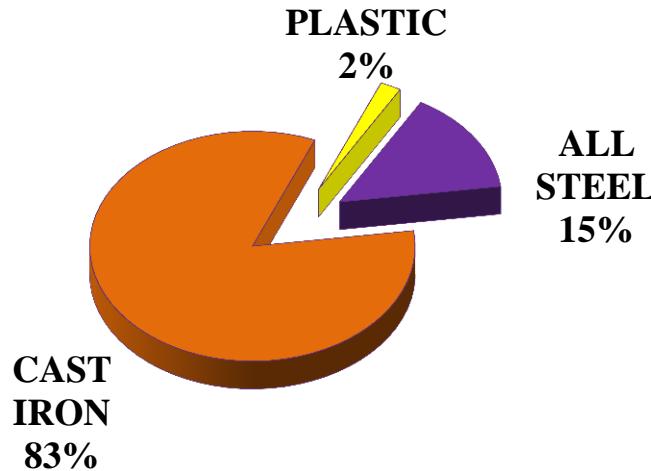
TOTAL MAIN INVENTORY BY MATERIAL

3,205 MILES



TOTAL MAIN LEAK REPAIRS BY MATERIAL

751 LEAKS (including damages)



NOTE: (*) CI Leaks include Other material Leaks.
Leak Count Totals Individual Repairs.

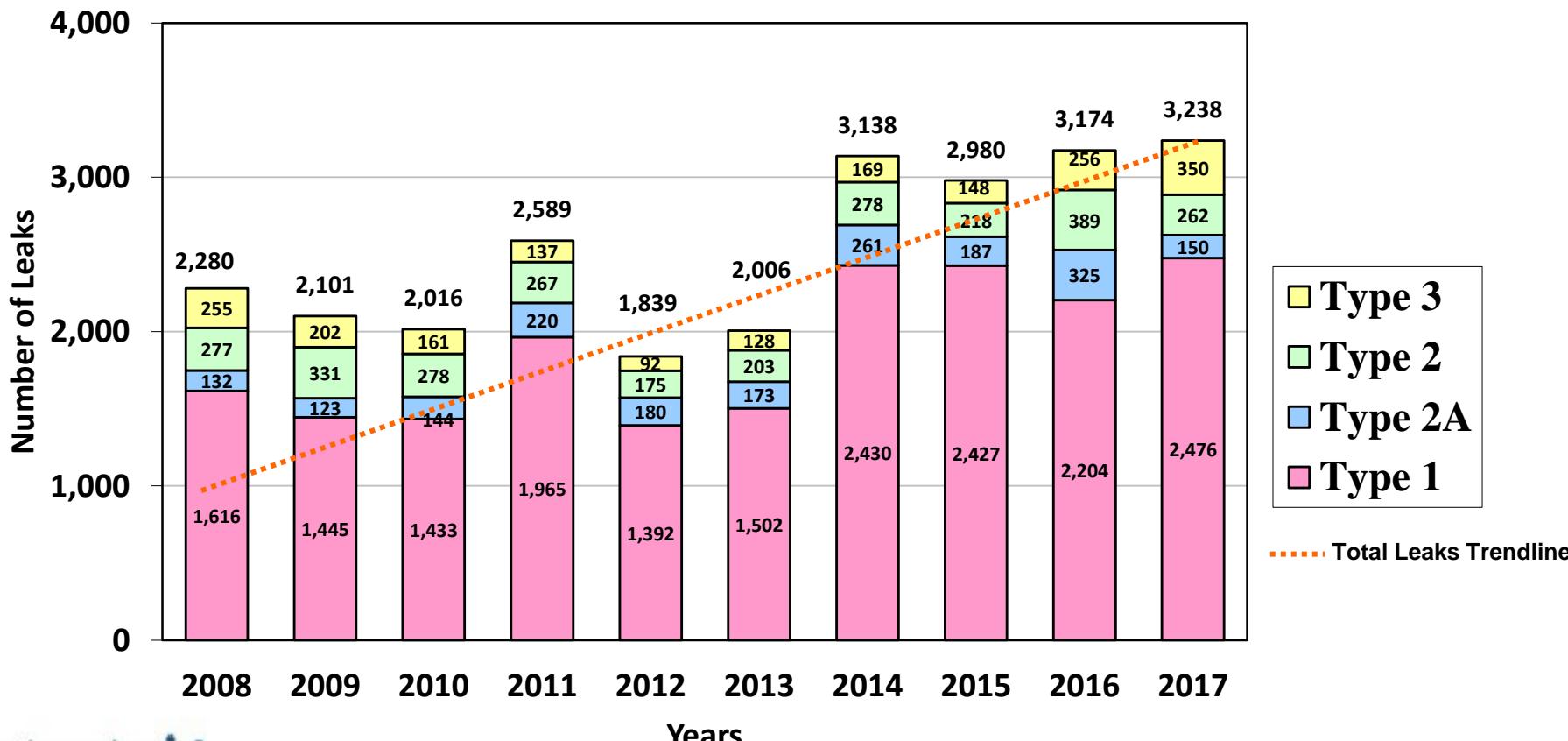
2017 SYSTEM INTEGRITY REPORT

NYC

LEAKS REPAIRED By Type

MAIN

(Including Damages)

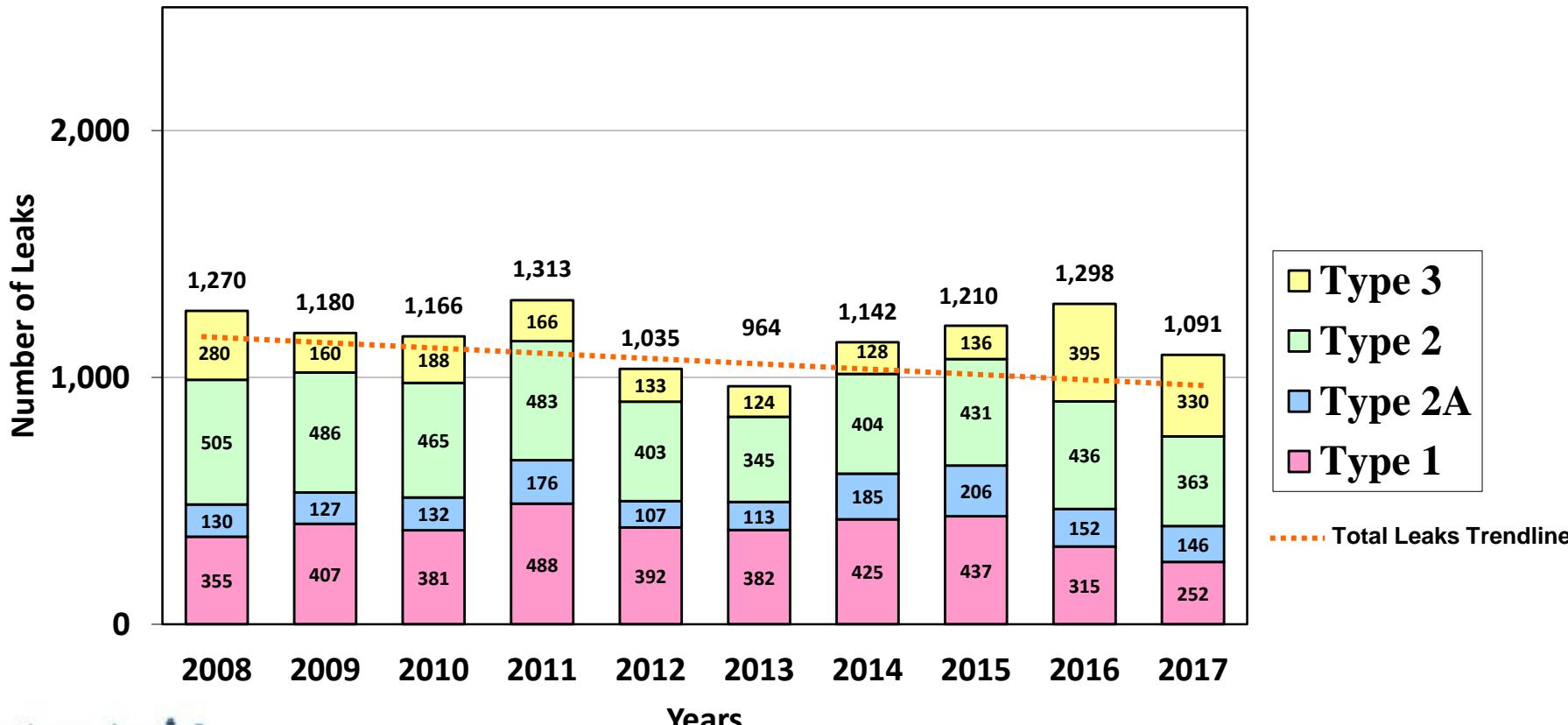


2017 SYSTEM INTEGRITY REPORT

LEAKS REPAIRED By Type

MAIN

(Including Damages)



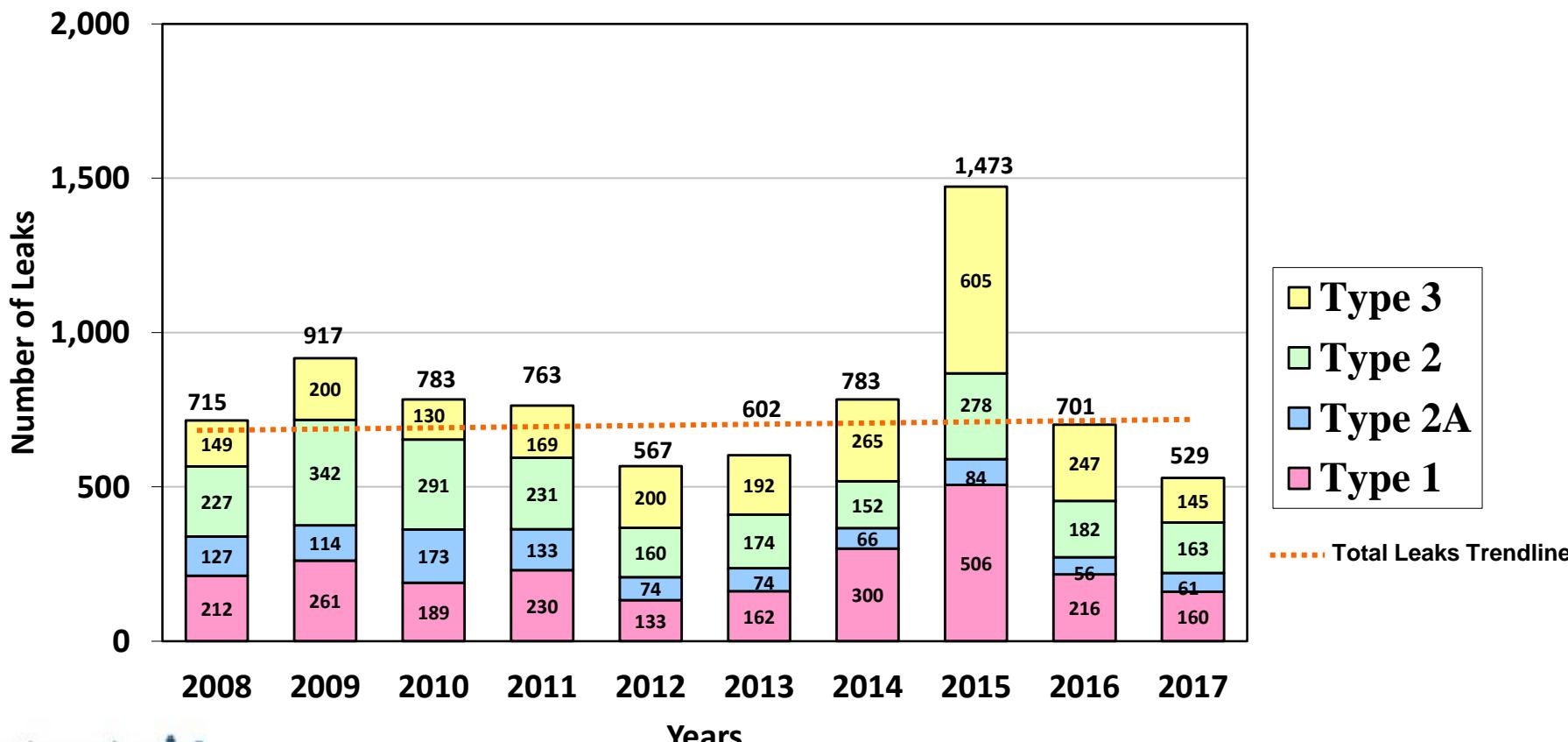
2017 SYSTEM INTEGRITY REPORT

UPSTATE

LEAKS REPAIRED By Type

MAIN

(Including Damages)



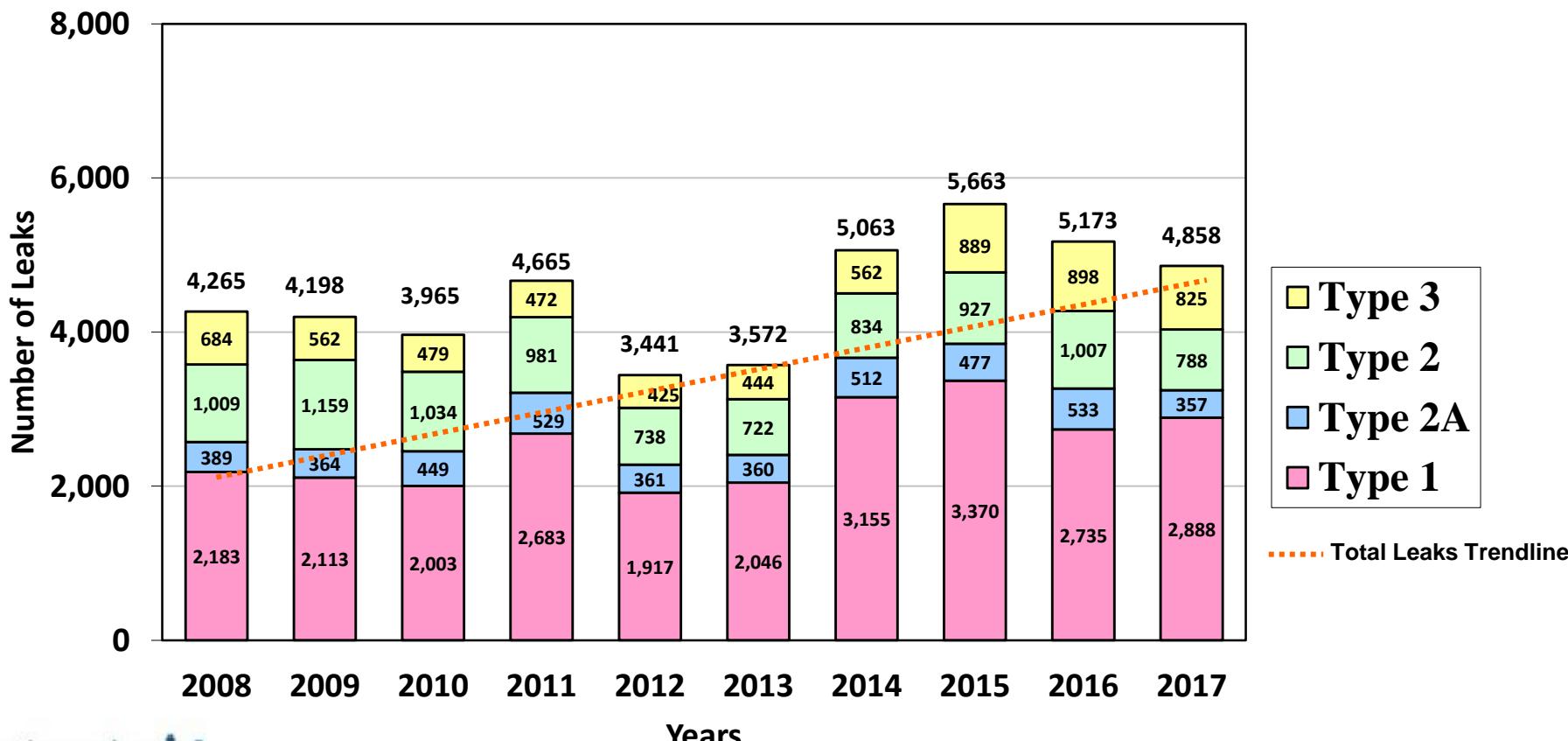
2017 SYSTEM INTEGRITY REPORT

NY State

LEAKS REPAIRED By Type

MAIN

(Including Damages)



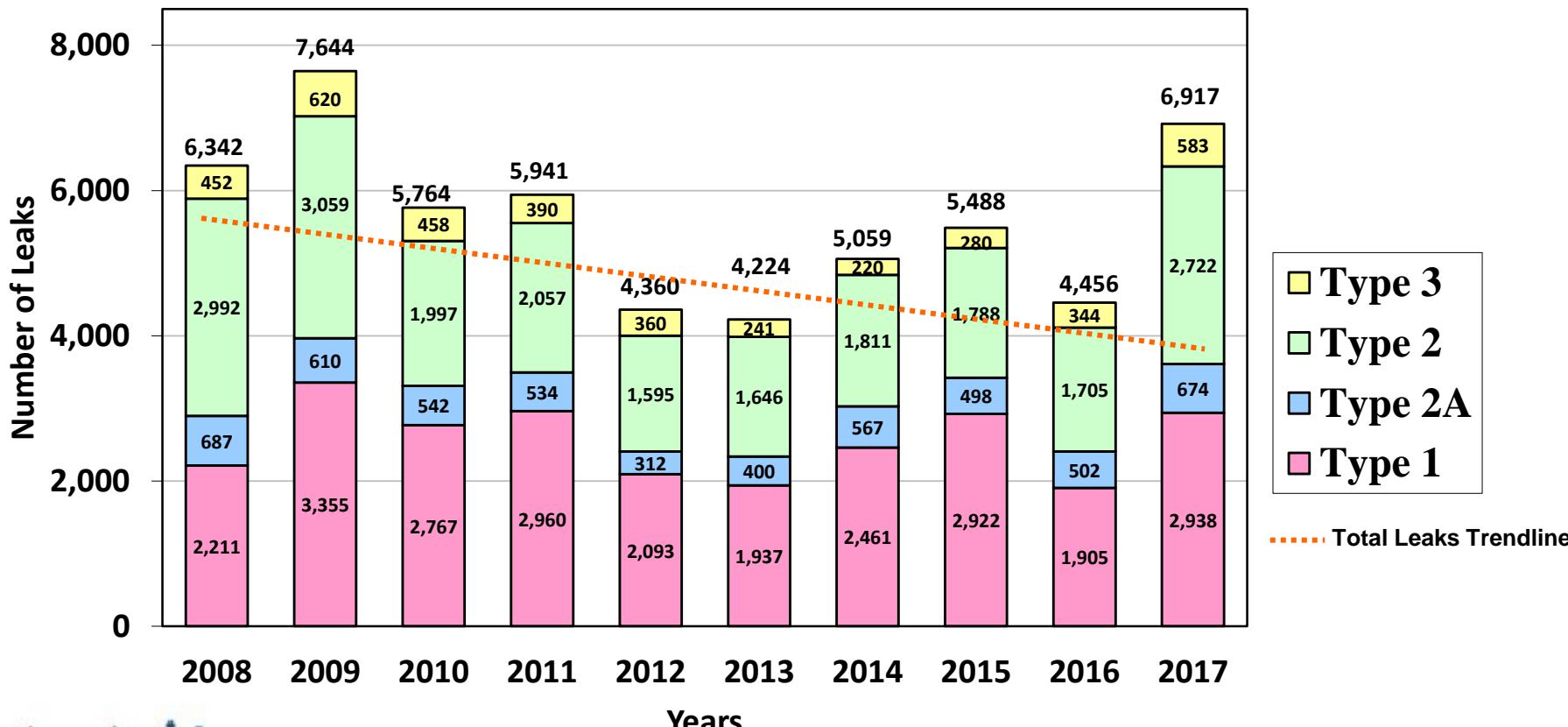
2017 SYSTEM INTEGRITY REPORT

BGC

LEAKS REPAIRED By Type

MAIN

(Including Damages)



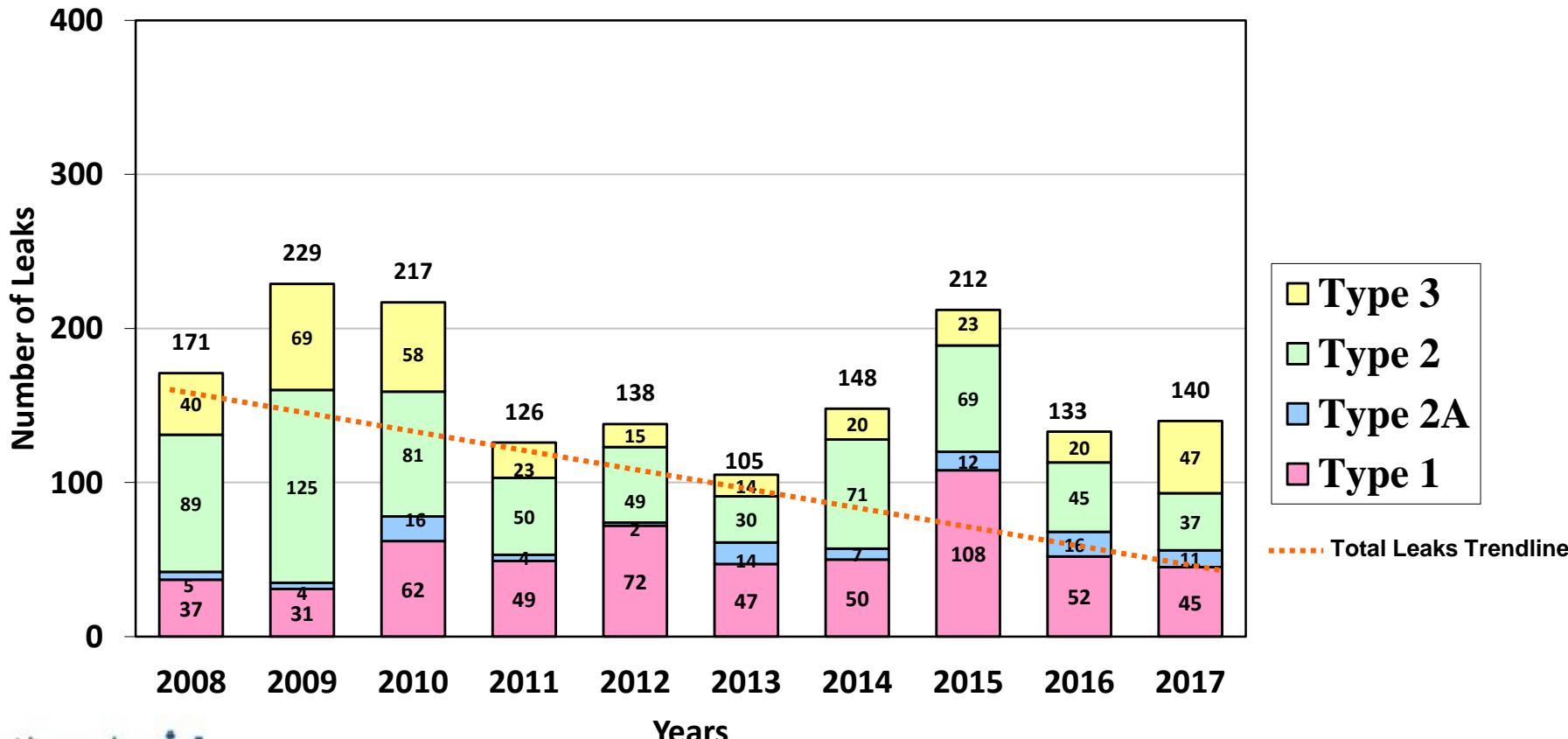
2017 SYSTEM INTEGRITY REPORT

EGC

LEAKS REPAIRED By Type

MAIN

(Including Damages)



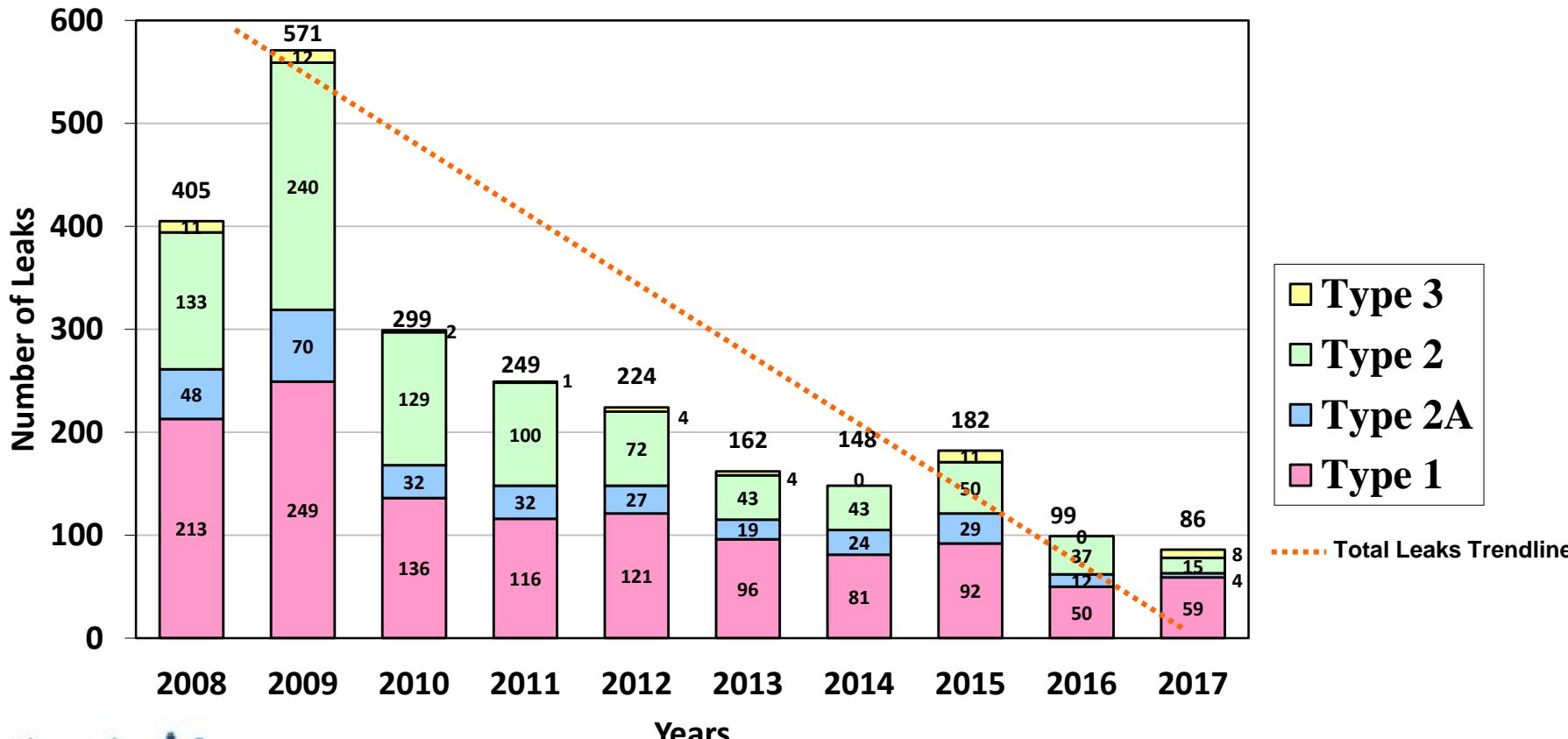
2017 SYSTEM INTEGRITY REPORT

CAPE

LEAKS REPAIRED By Type

MAIN

(Including Damages)



2017 SYSTEM INTEGRITY REPORT

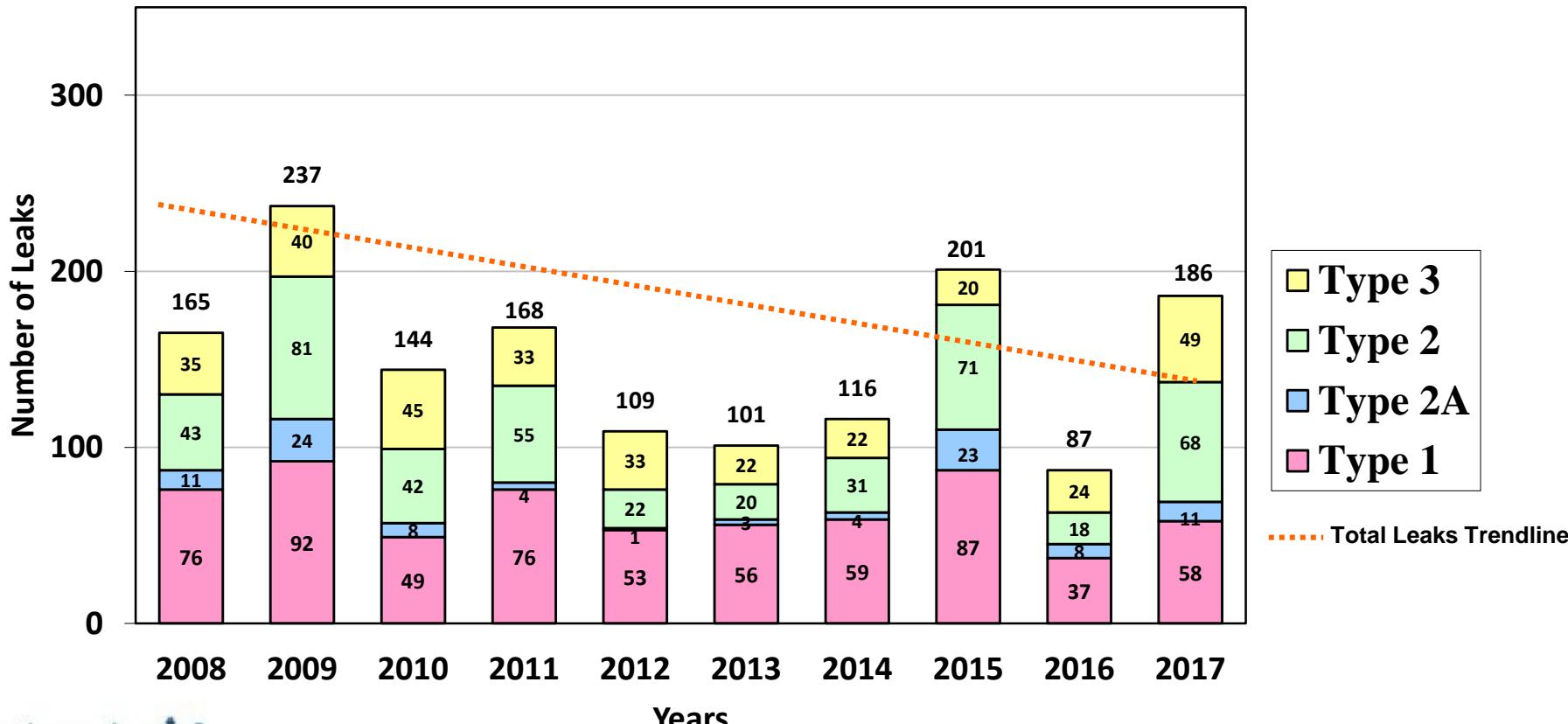
LOWELL

LEAKS REPAIRED

By Type

MAIN

(Including Damages)



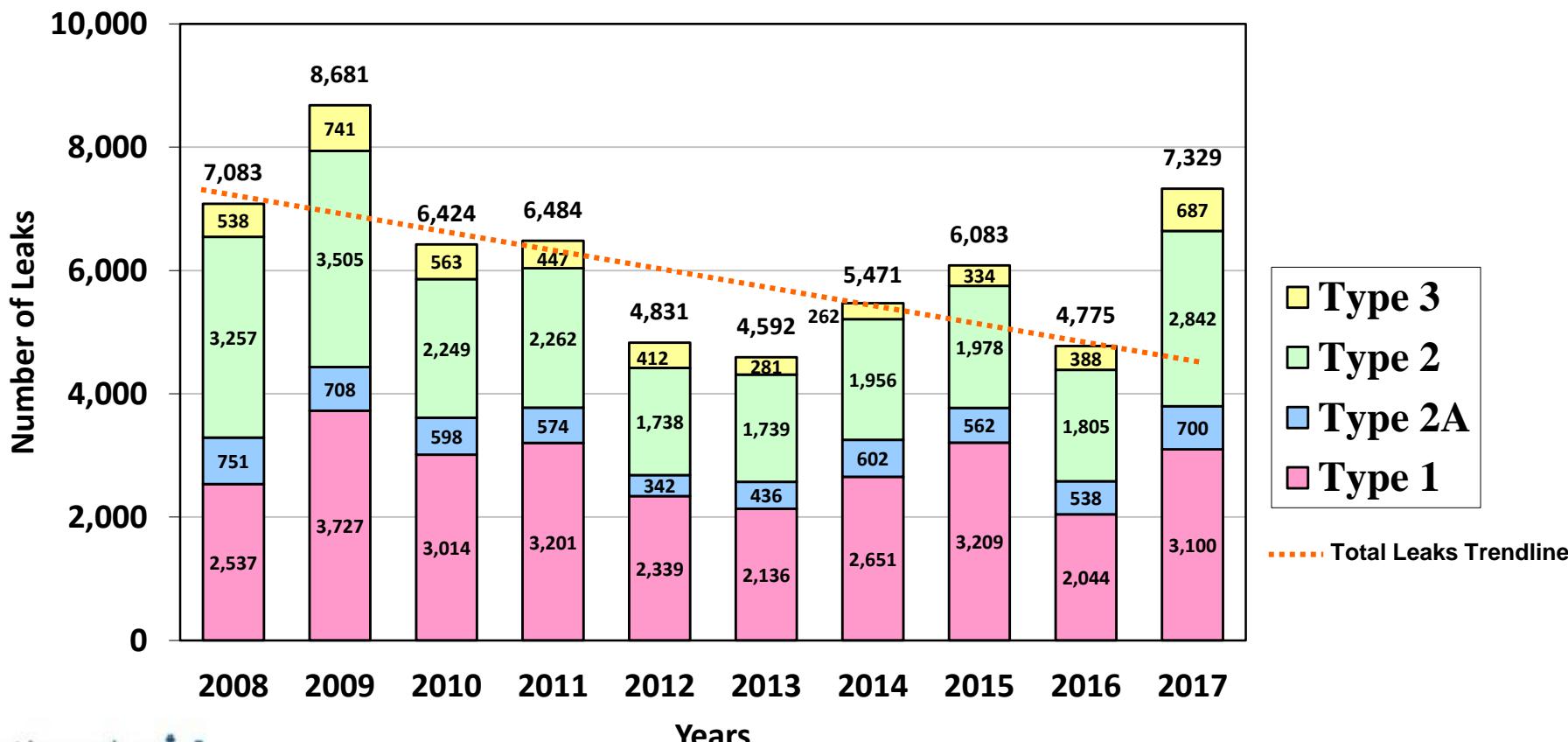
2017 SYSTEM INTEGRITY REPORT

MA

LEAKS REPAIRED By Type

MAIN

(Including Damages)



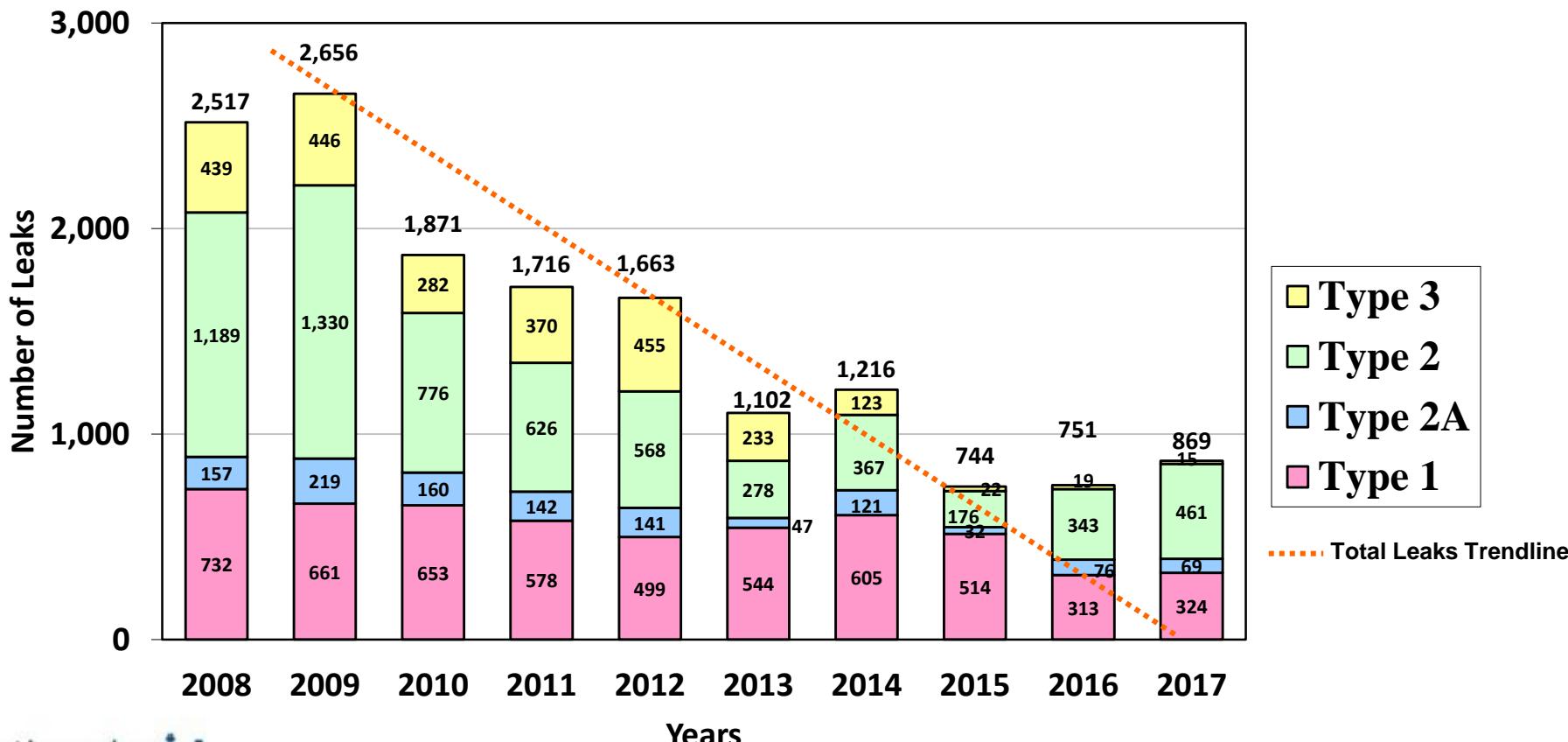
2017 SYSTEM INTEGRITY REPORT

RI

LEAKS REPAIRED By Type

MAIN

(Including Damages)



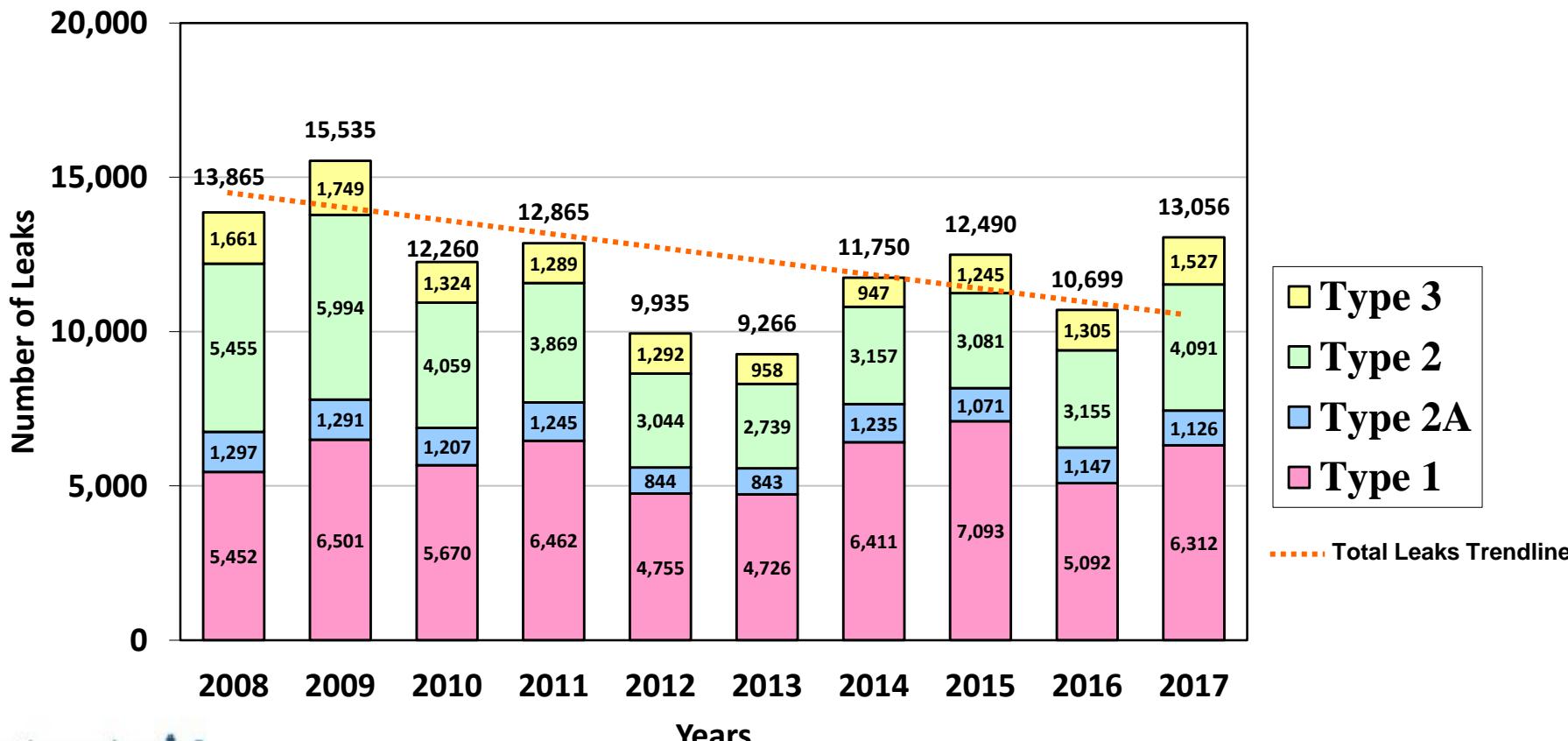
2017 SYSTEM INTEGRITY REPORT

US NGrid

LEAKS REPAIRED By Type

MAIN

(Including Damages)



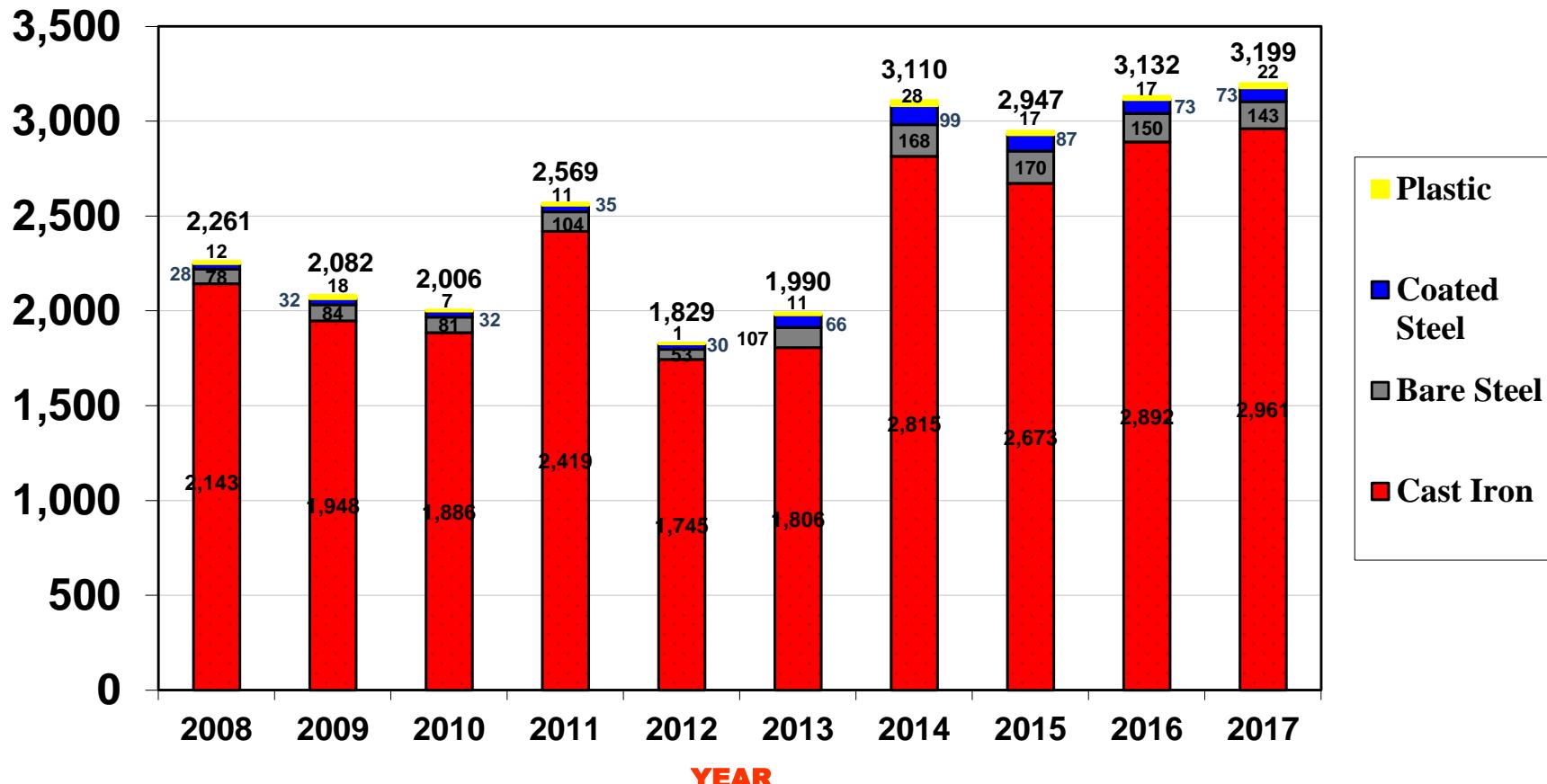
2017 SYSTEM INTEGRITY REPORT

2008 - 2017 MAIN LEAK REPAIRS

All Main Leak Repairs by Material
(Excluding Damages)

NUMBER OF MAIN
LEAK REPAIRS

NYC

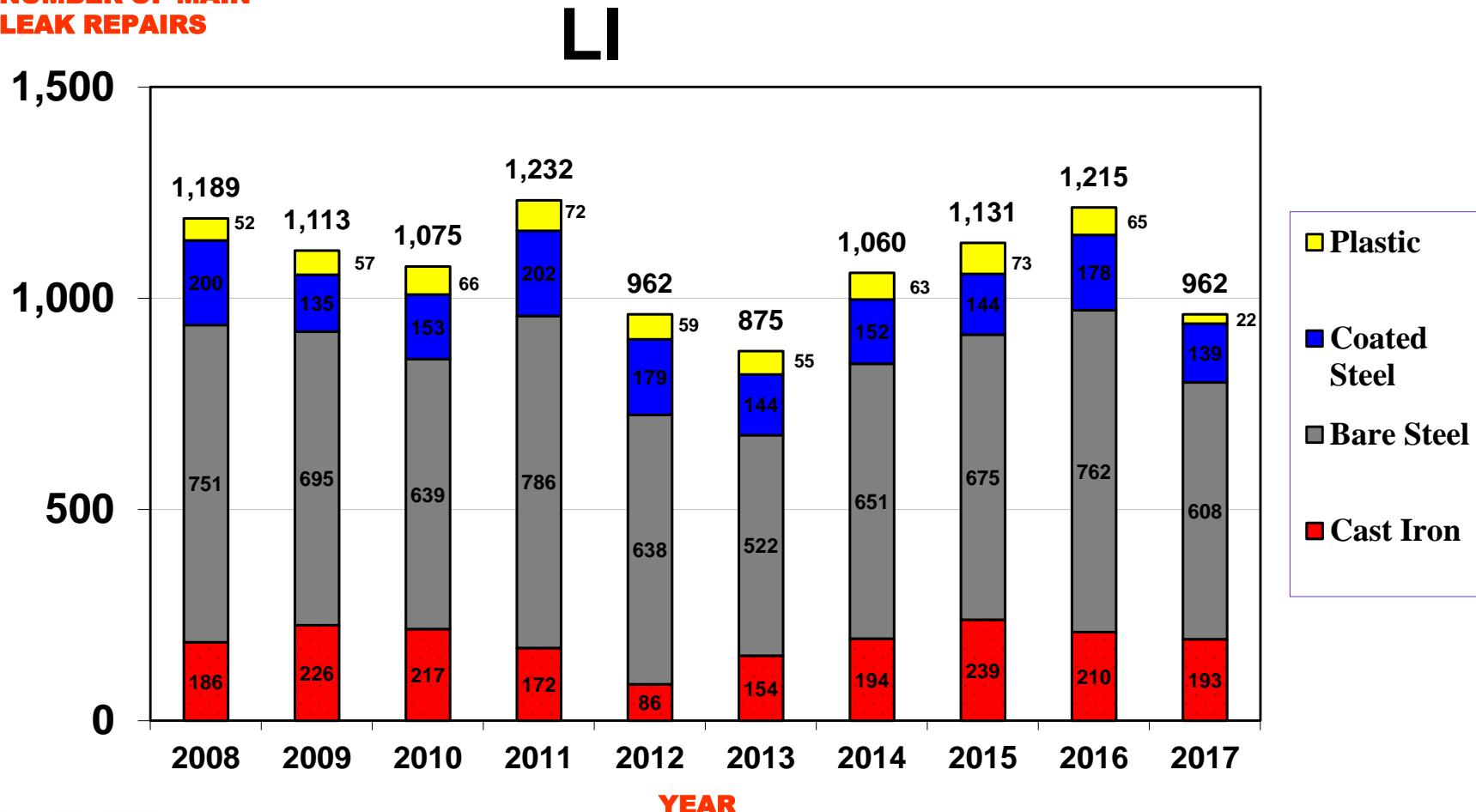


2017 SYSTEM INTEGRITY REPORT

2008 - 2017 MAIN LEAK REPAIRS

All Main Leak Repairs by Material (Excluding Damages)

**NUMBER OF MAIN
LEAK REPAIRS**



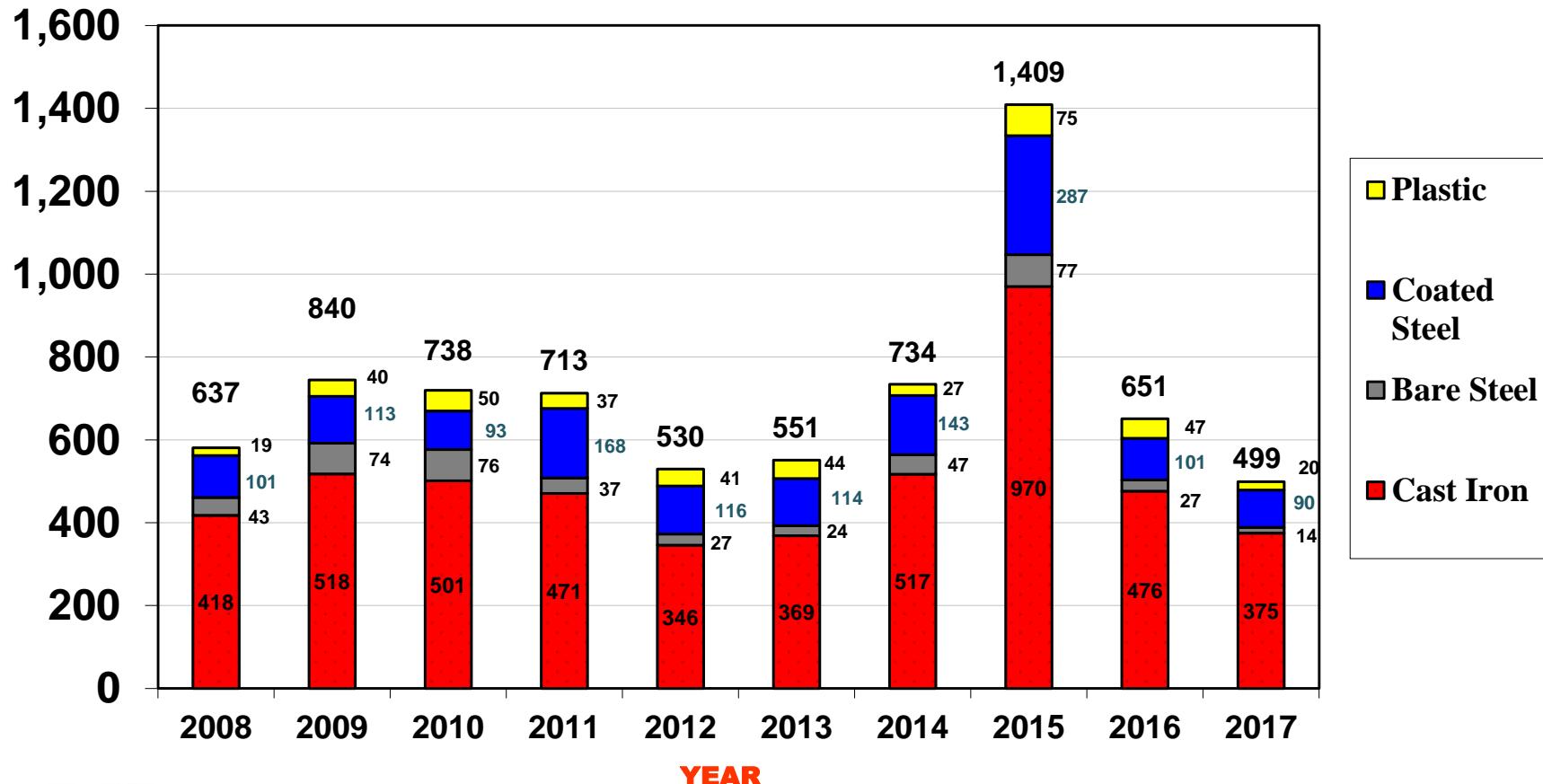
2017 SYSTEM INTEGRITY REPORT

2008 - 2017 MAIN LEAK REPAIRS

All Main Leak Repairs by Material
(Excluding Damages)

NUMBER OF MAIN
LEAK REPAIRS

UPSTATE



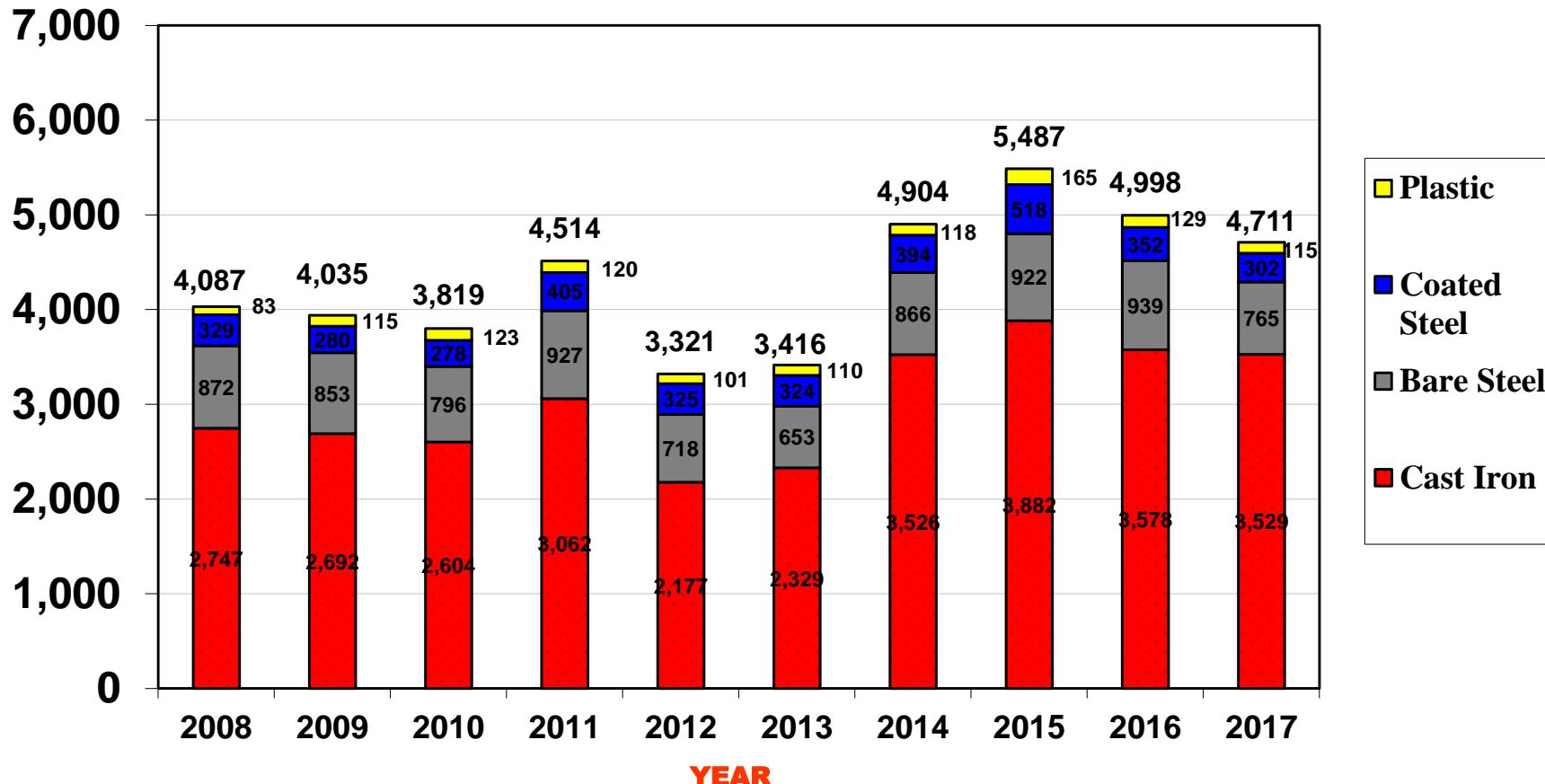
2017 SYSTEM INTEGRITY REPORT

2008 - 2017 MAIN LEAK REPAIRS

All Main Leak Repairs by Material
(Excluding Damages)

NUMBER OF MAIN
LEAK REPAIRS

NY State



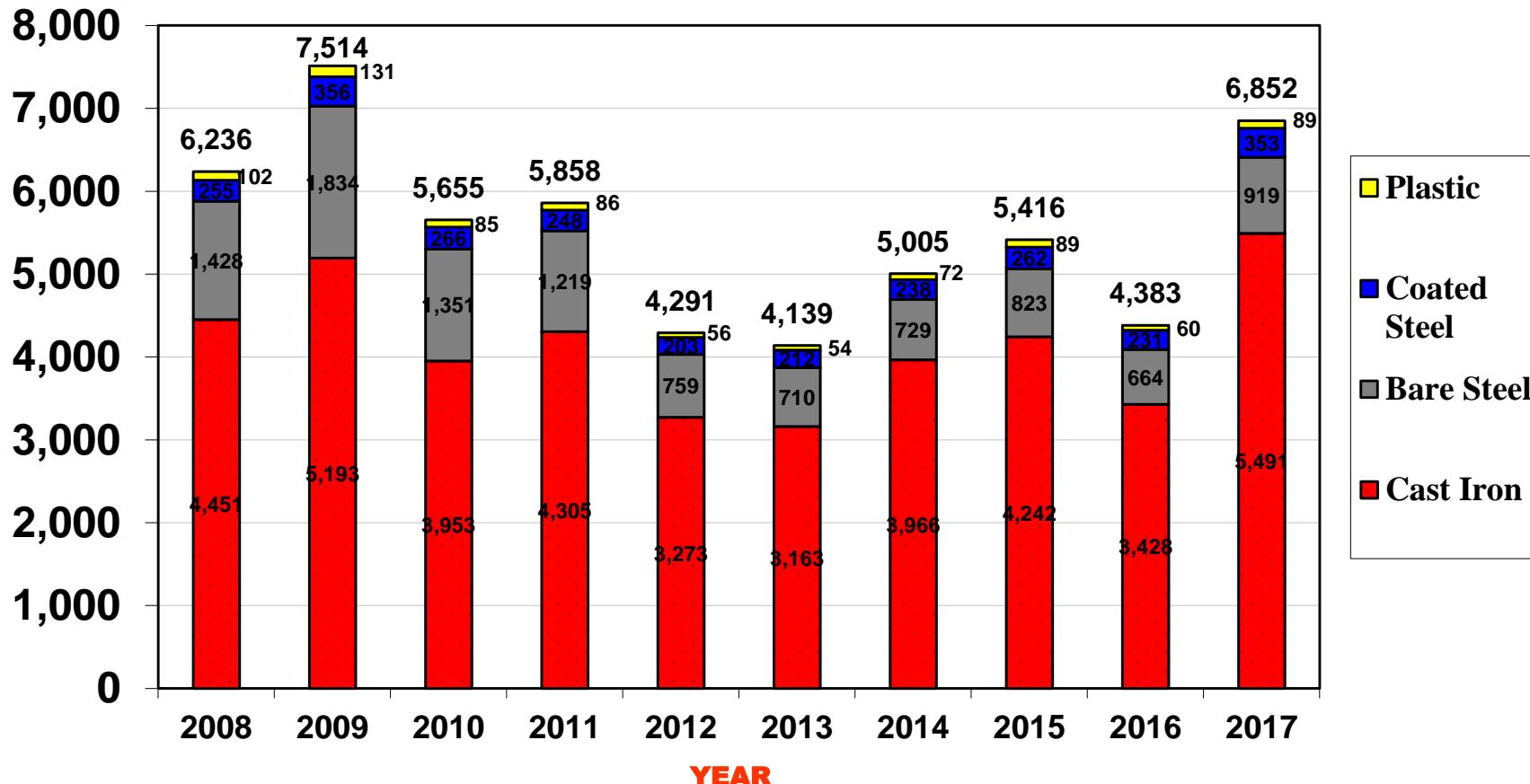
2017 SYSTEM INTEGRITY REPORT

2008 - 2017 MAIN LEAK REPAIRS

All Main Leak Repairs by Material
(Excluding Damages)

NUMBER OF MAIN
LEAK REPAIRS

BGC



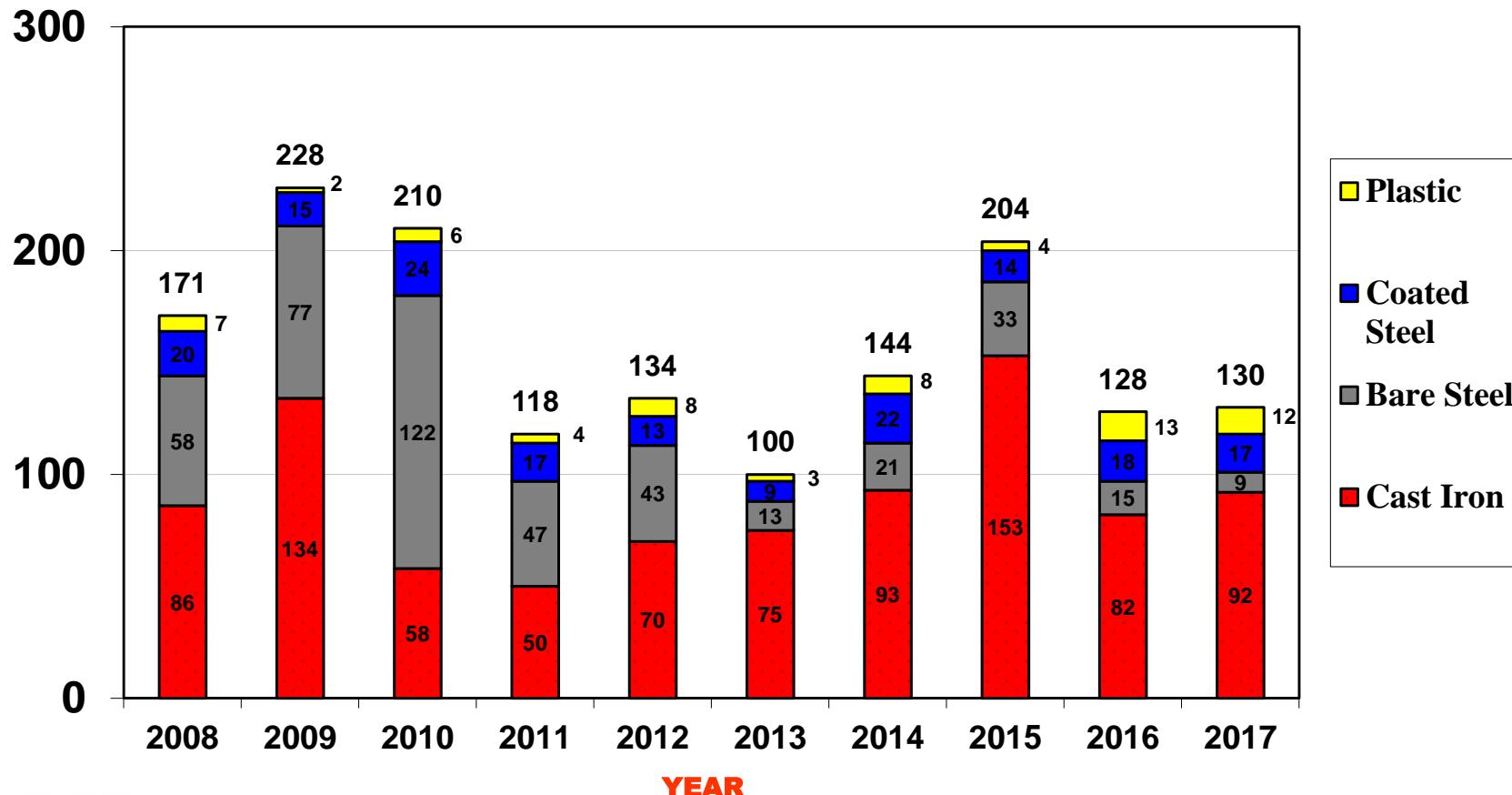
2017 SYSTEM INTEGRITY REPORT

2008 - 2017 MAIN LEAK REPAIRS

All Main Leak Repairs by Material
(Excluding Damages)

NUMBER OF MAIN
LEAK REPAIRS

EGC



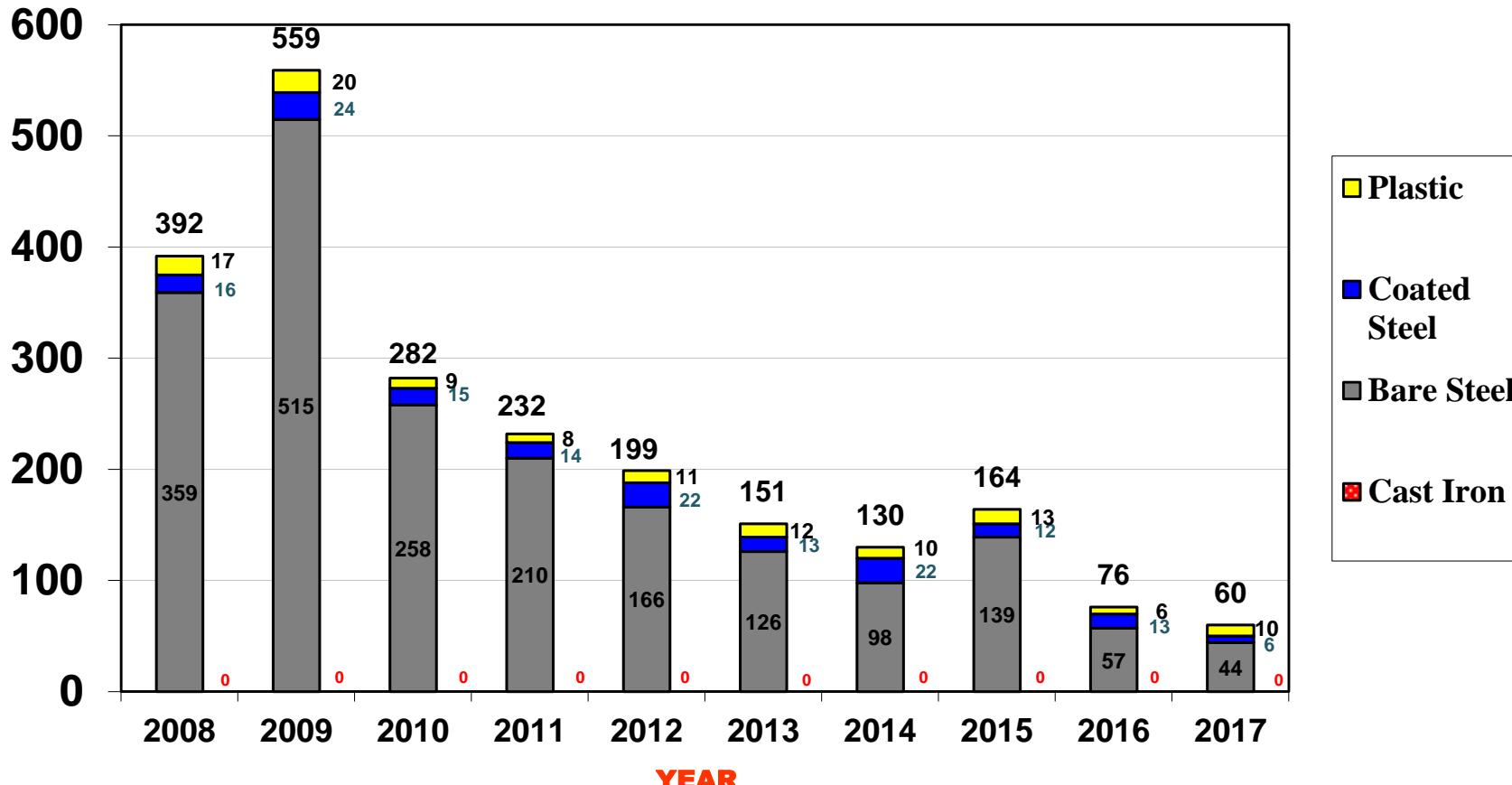
2017 SYSTEM INTEGRITY REPORT

2008 - 2017 MAIN LEAK REPAIRS

All Main Leak Repairs by Material
(Excluding Damages)

NUMBER OF MAIN
LEAK REPAIRS

CAPE



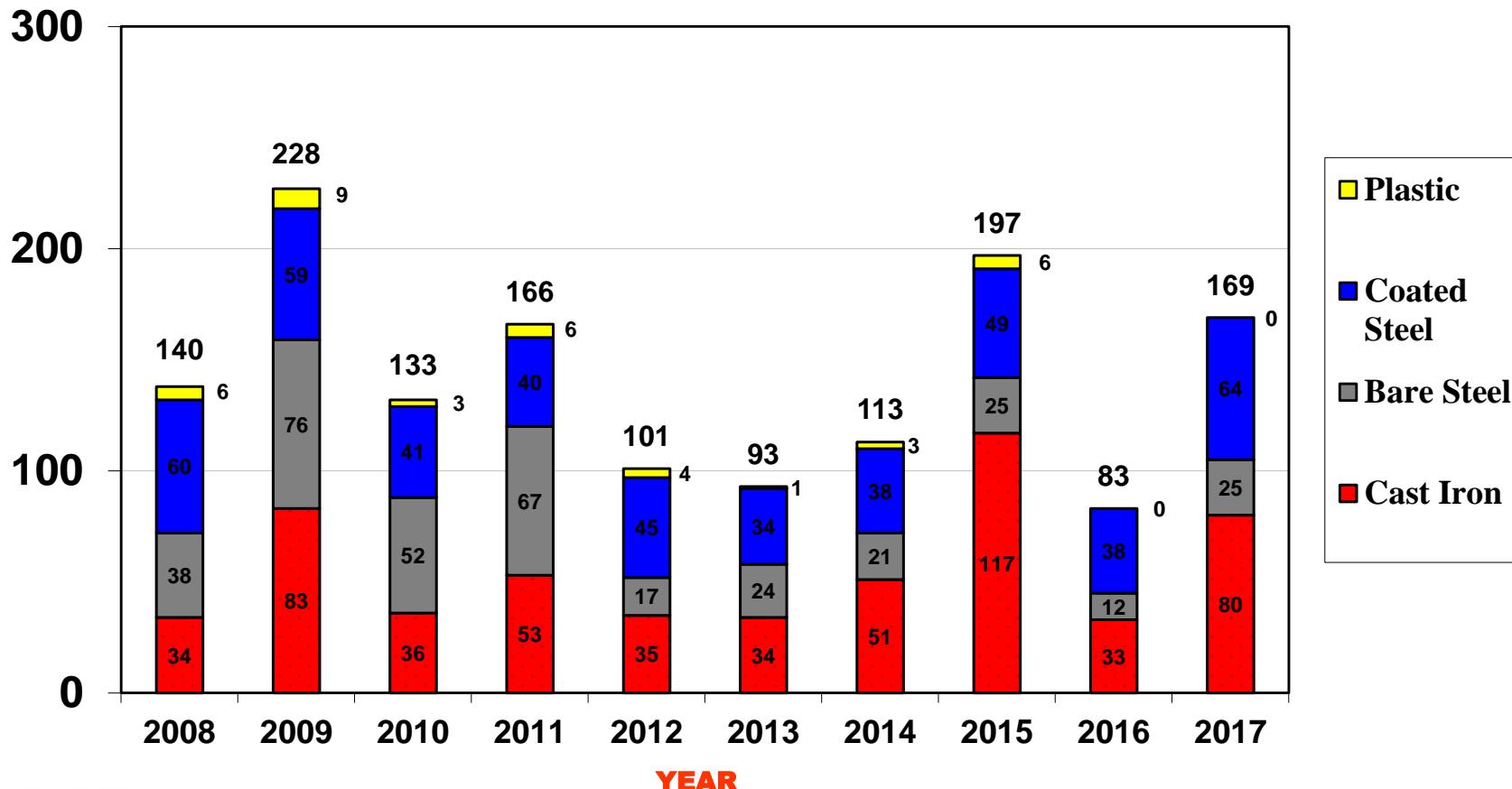
2017 SYSTEM INTEGRITY REPORT

2008 - 2017 MAIN LEAK REPAIRS

All Main Leak Repairs by Material
(Excluding Damages)

NUMBER OF MAIN
LEAK REPAIRS

LOWELL



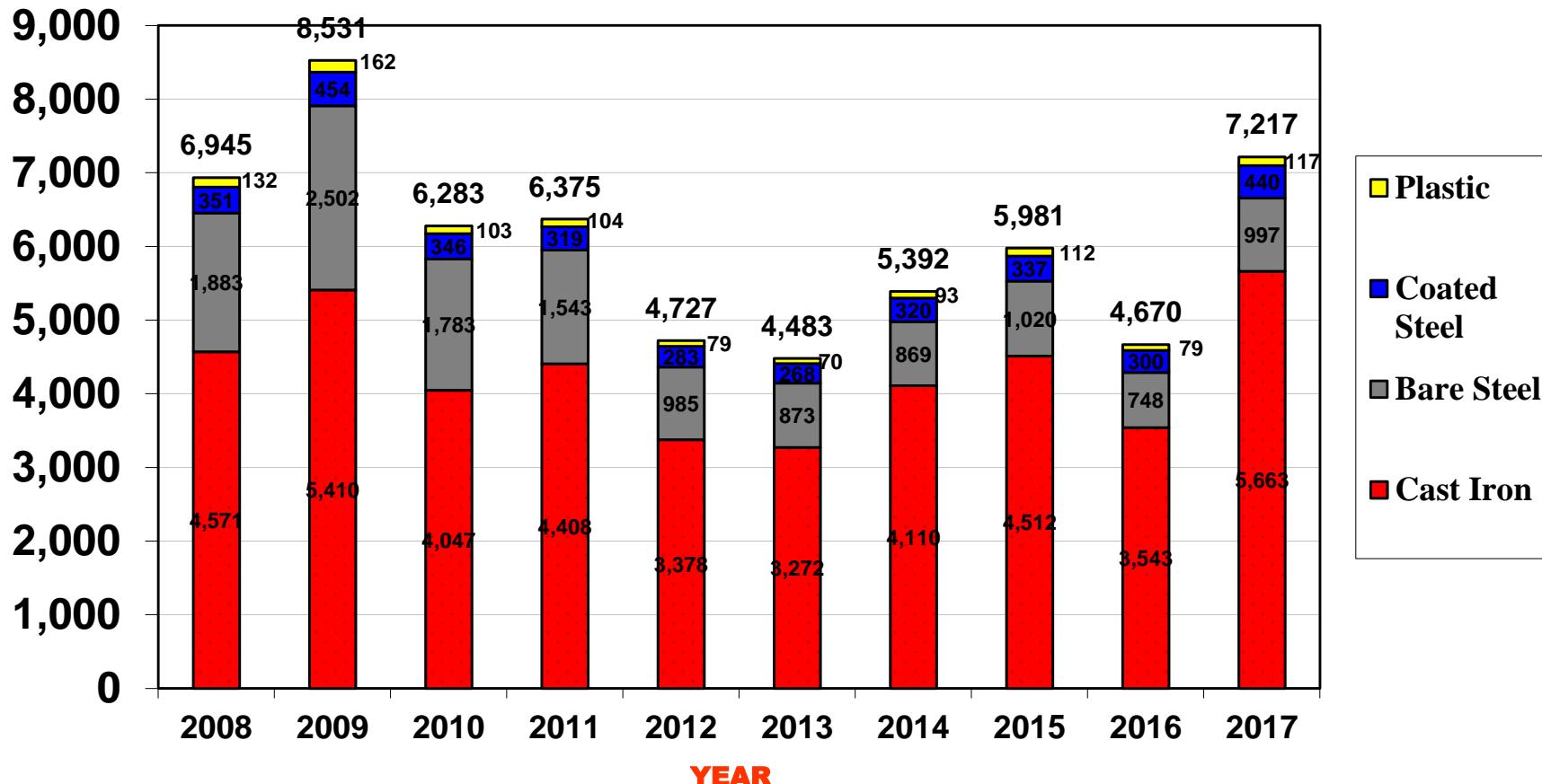
2017 SYSTEM INTEGRITY REPORT

2008 - 2017 MAIN LEAK REPAIRS

All Main Leak Repairs by Material
(Excluding Damages)

**NUMBER OF MAIN
LEAK REPAIRS**

MA



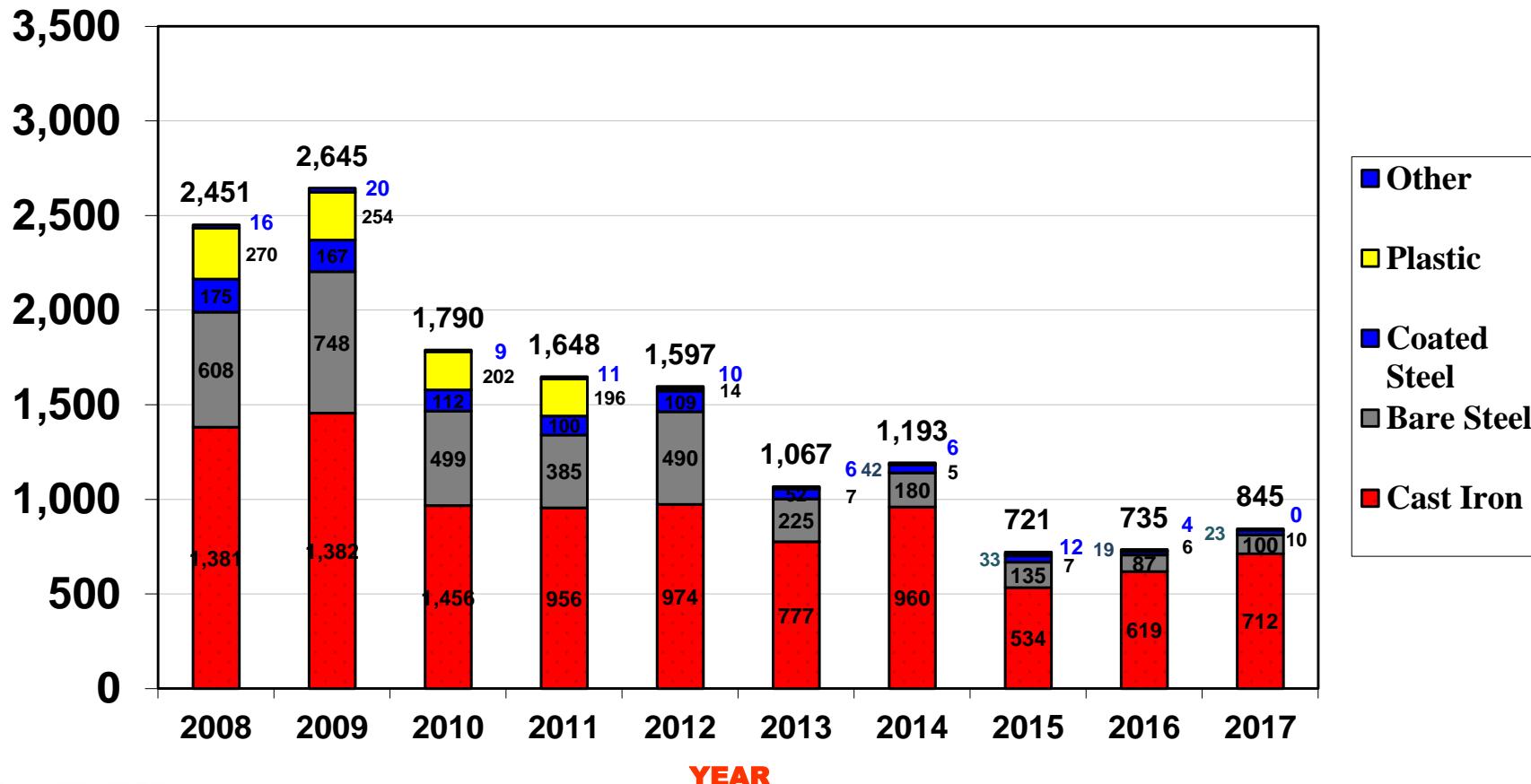
2017 SYSTEM INTEGRITY REPORT

2008 - 2017 MAIN LEAK REPAIRS

All Main Leak Repairs by Material
(Excluding Damages)

NUMBER OF MAIN
LEAK REPAIRS

RI



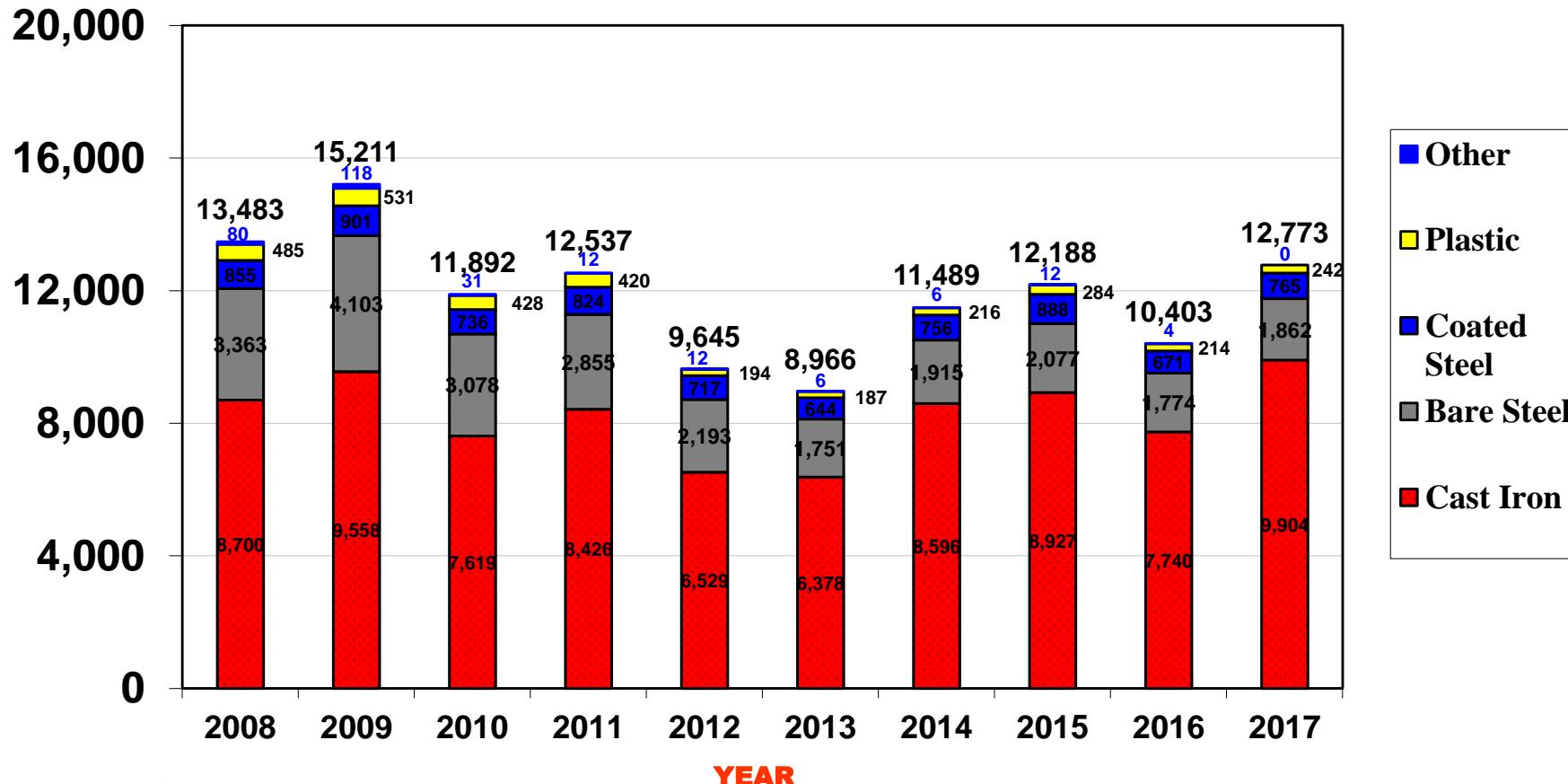
2017 SYSTEM INTEGRITY REPORT

2007 -2016 MAIN LEAK REPAIRS

All Main Leak Repairs by Material
(Excluding Damages)

NUMBER OF MAIN
LEAK REPAIRS

US NGrid

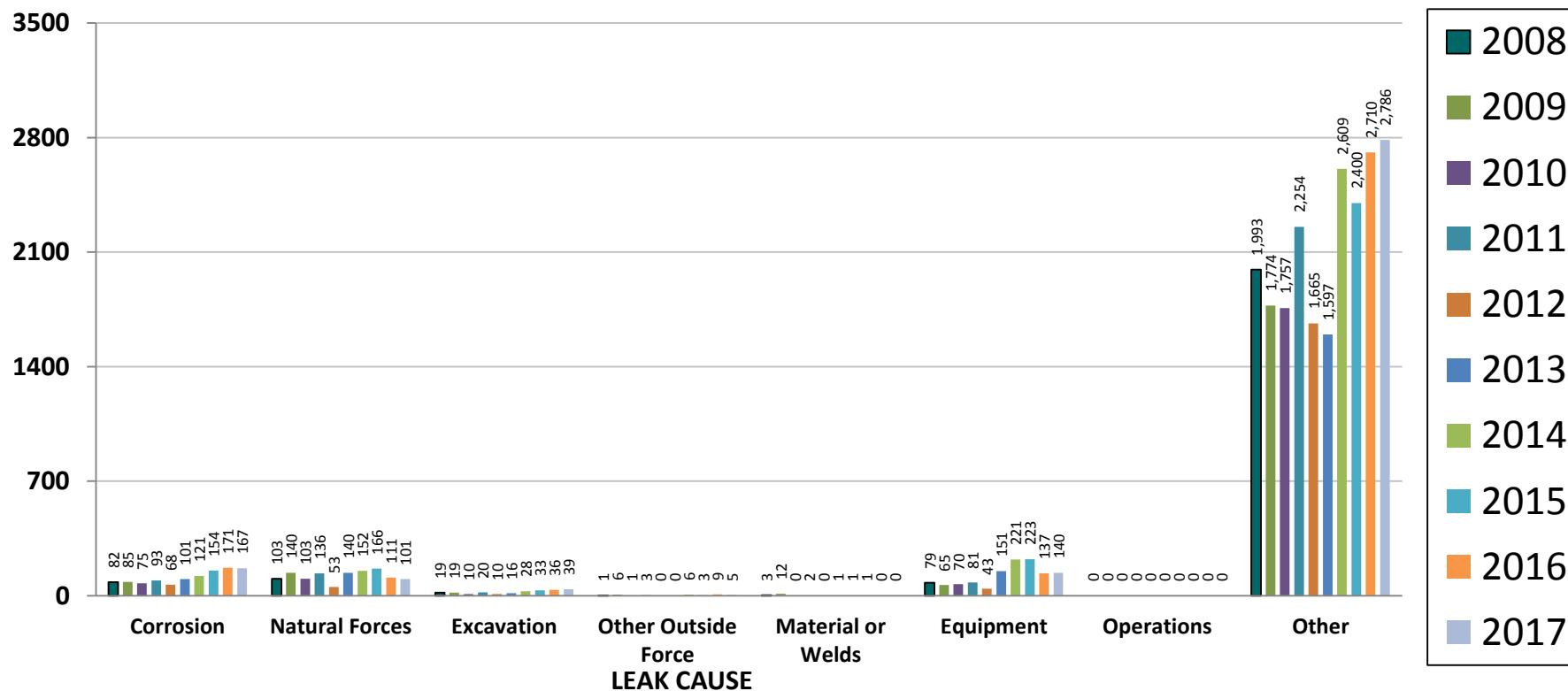


2017 SYSTEM INTEGRITY REPORT

NYC

MAIN LEAKS REPAIRED COMPARISON BY LEAK CAUSES

LEAK REPAIRS

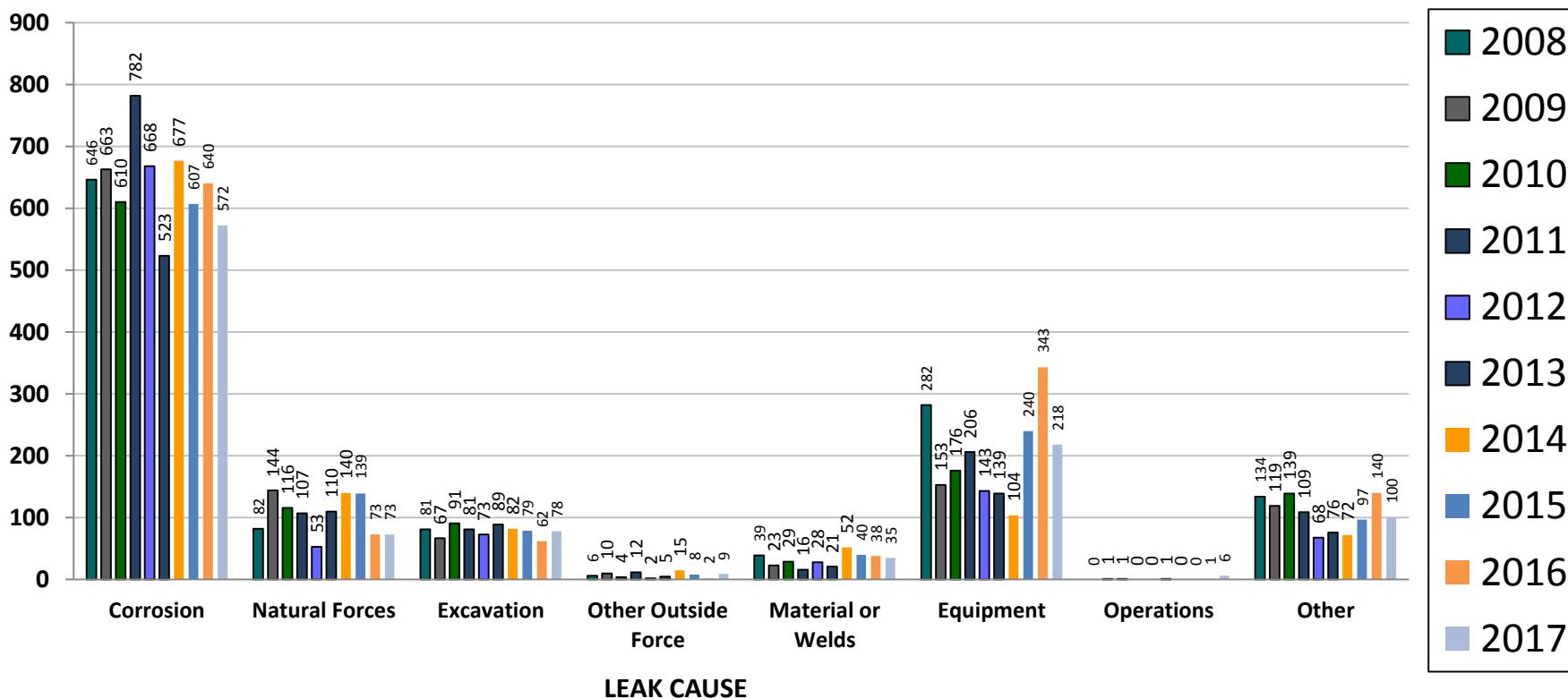


2017 SYSTEM INTEGRITY REPORT



MAIN LEAKS REPAIRED COMPARISON BY LEAK CAUSES

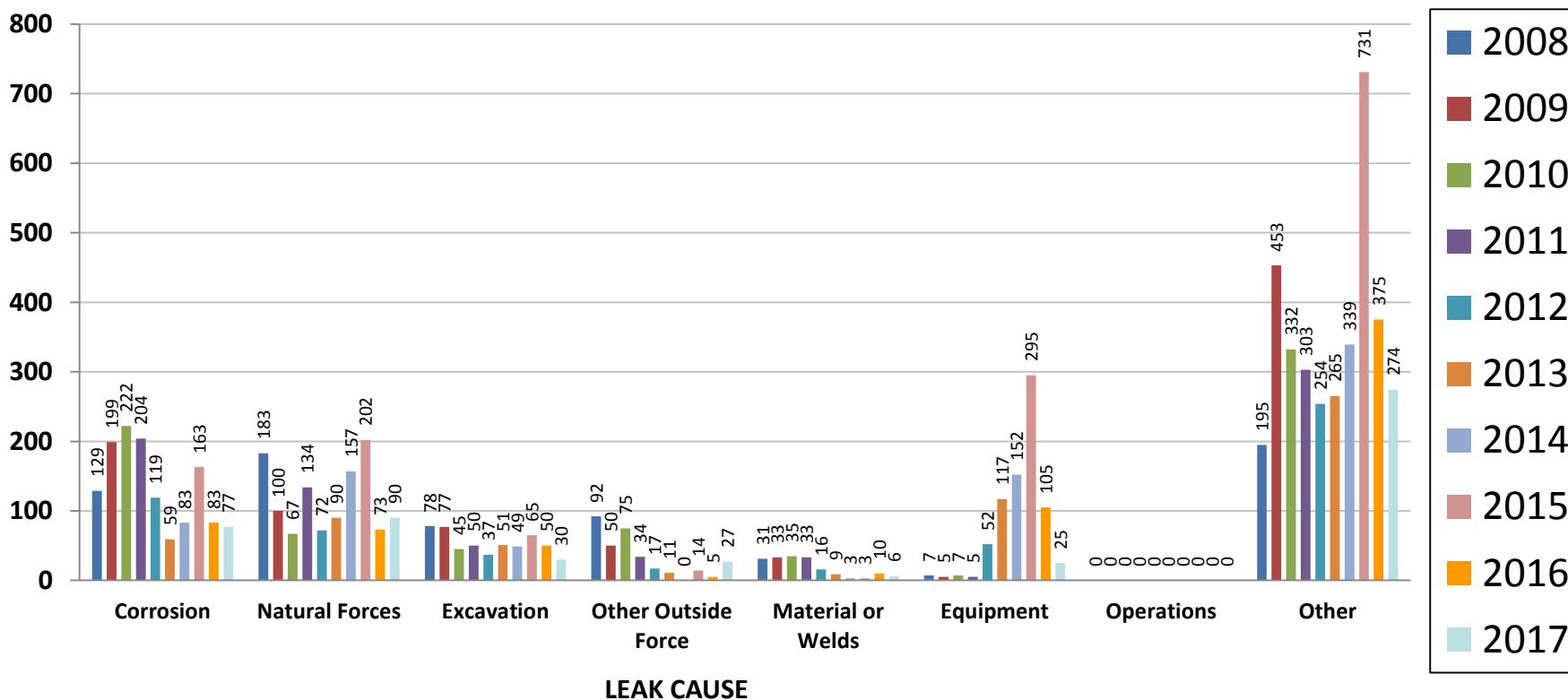
LEAK REPAIRS



2017 SYSTEM INTEGRITY REPORT

UPSTATE MAIN LEAKS REPAIRED COMPARISON BY LEAK CAUSES

LEAK REPAIRS

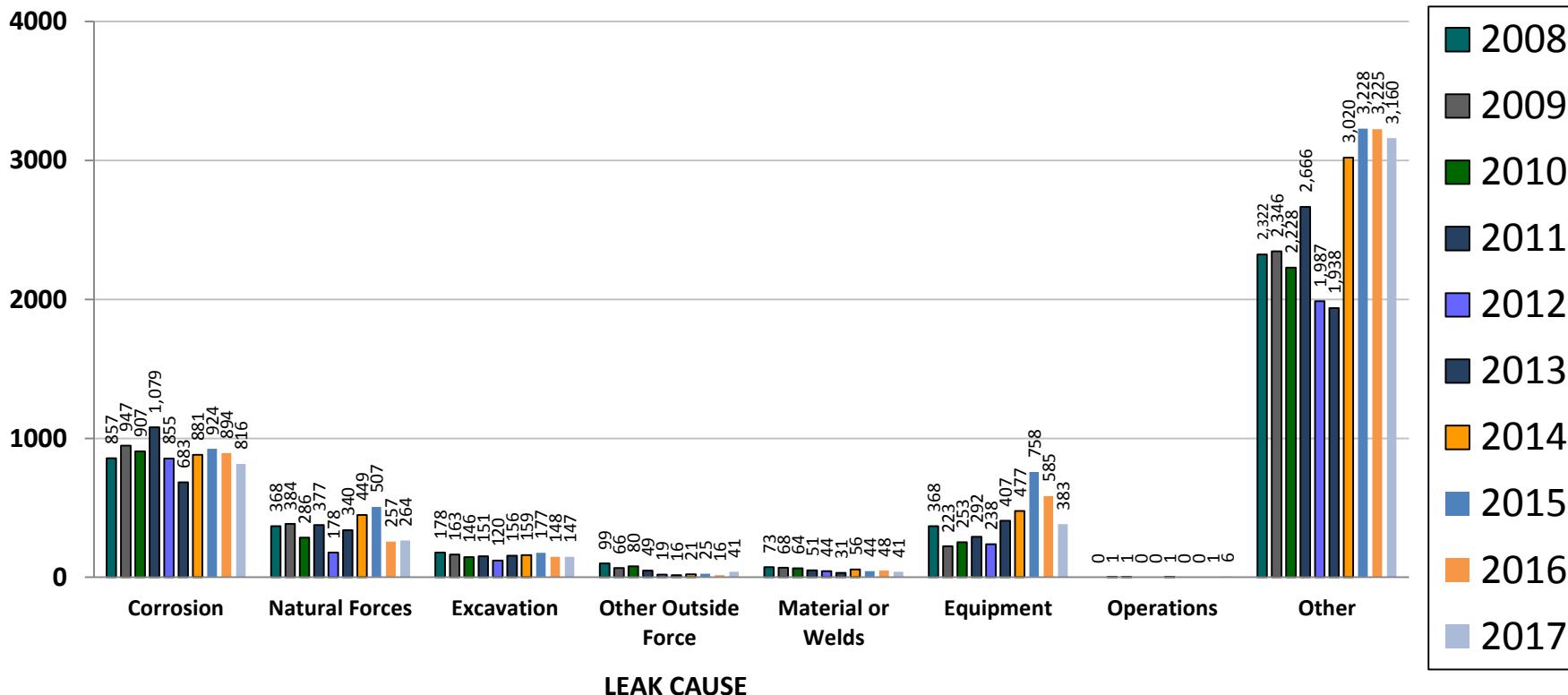


2017 SYSTEM INTEGRITY REPORT

NY-STATE

MAIN LEAKS REPAIRED COMPARISON BY LEAK CAUSES

LEAK REPAIRS

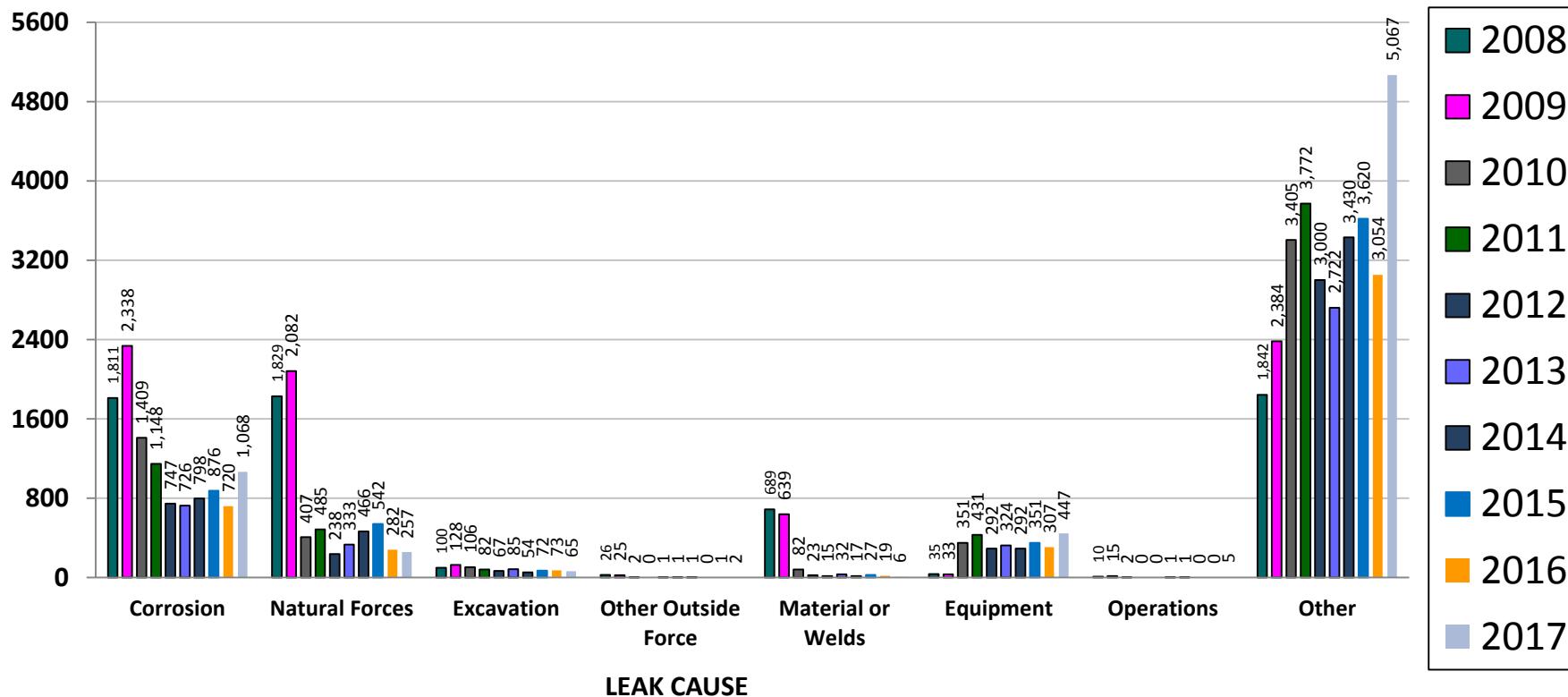


2017 SYSTEM INTEGRITY REPORT

BGC

MAIN LEAKS REPAIRED COMPARISON BY LEAK CAUSES

LEAK REPAIRS

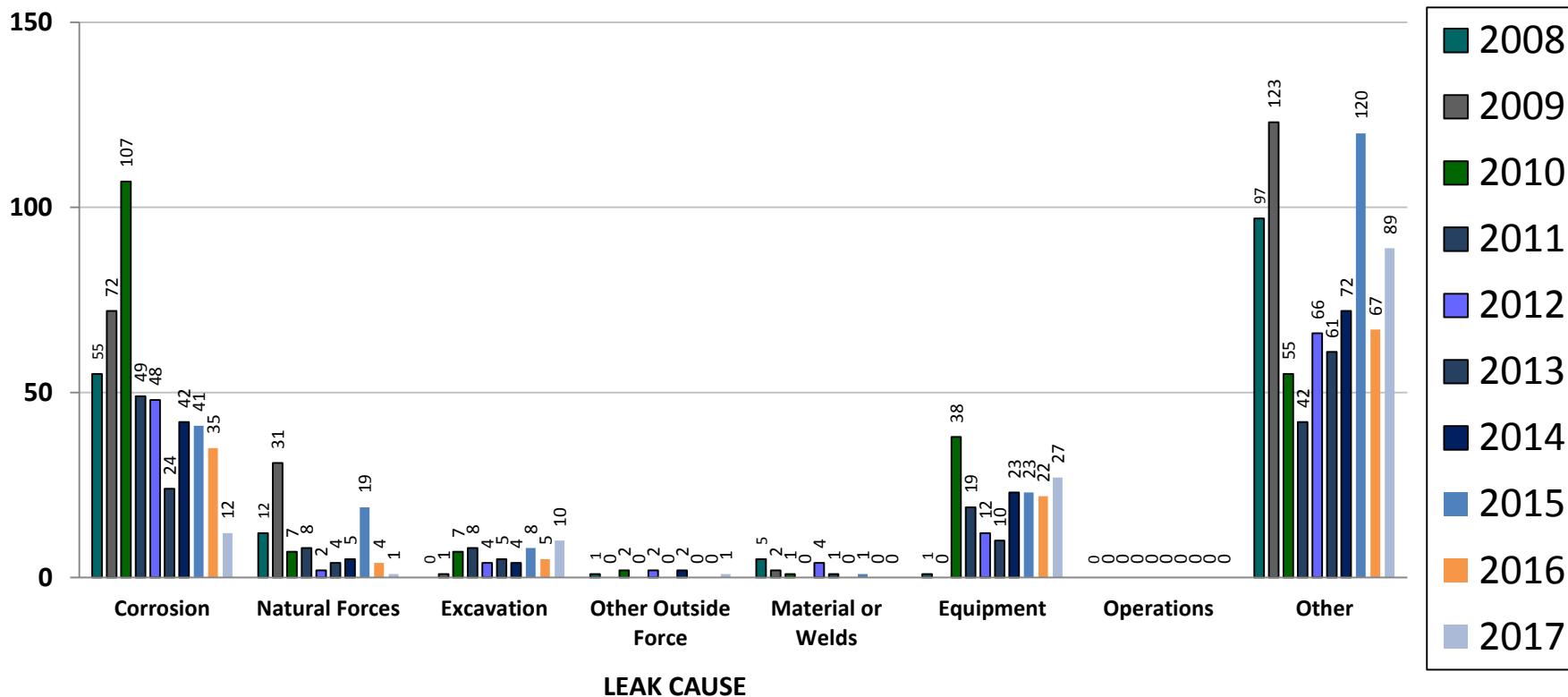


2017 SYSTEM INTEGRITY REPORT

EGC

MAIN LEAKS REPAIRED COMPARISON BY LEAK CAUSES

LEAK REPAIRS

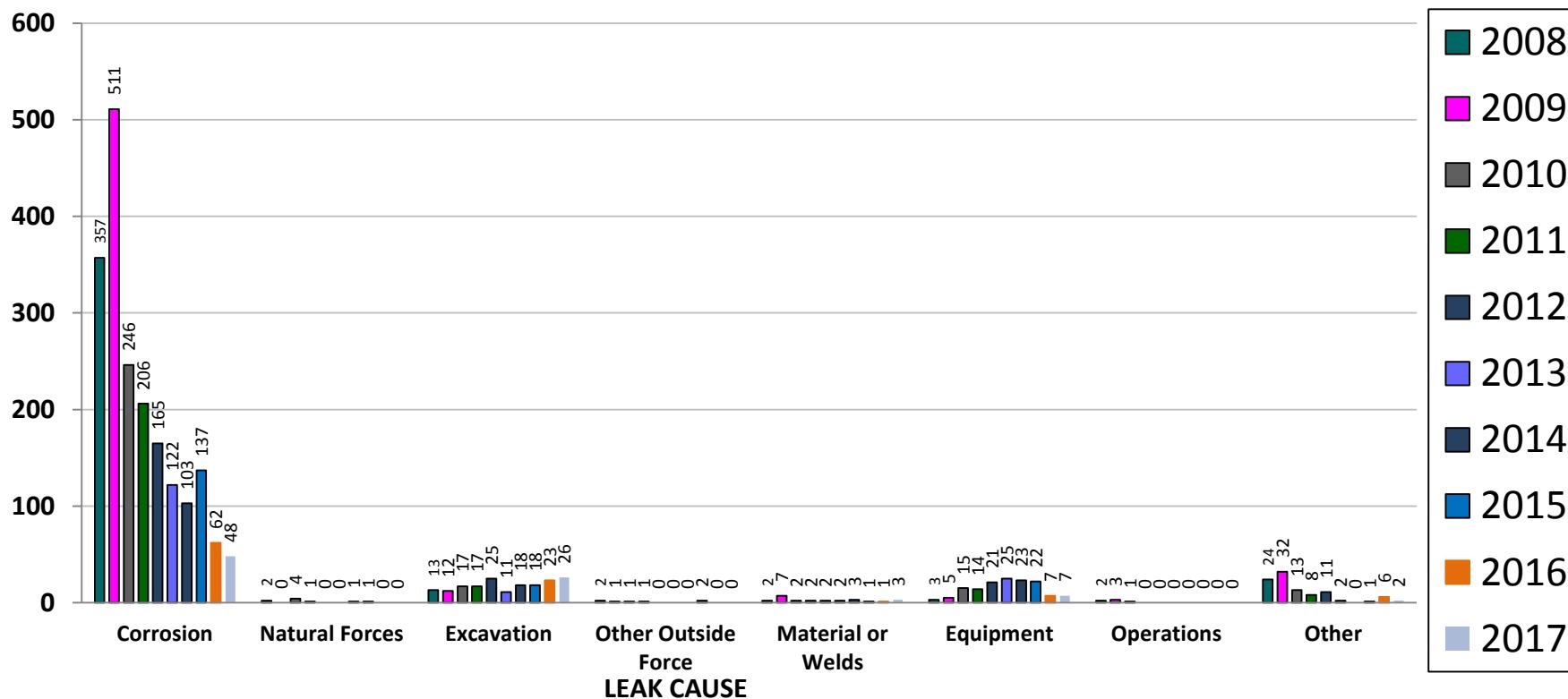


2017 SYSTEM INTEGRITY REPORT

CCC

MAIN LEAKS REPAIRED COMPARISON BY LEAK CAUSES

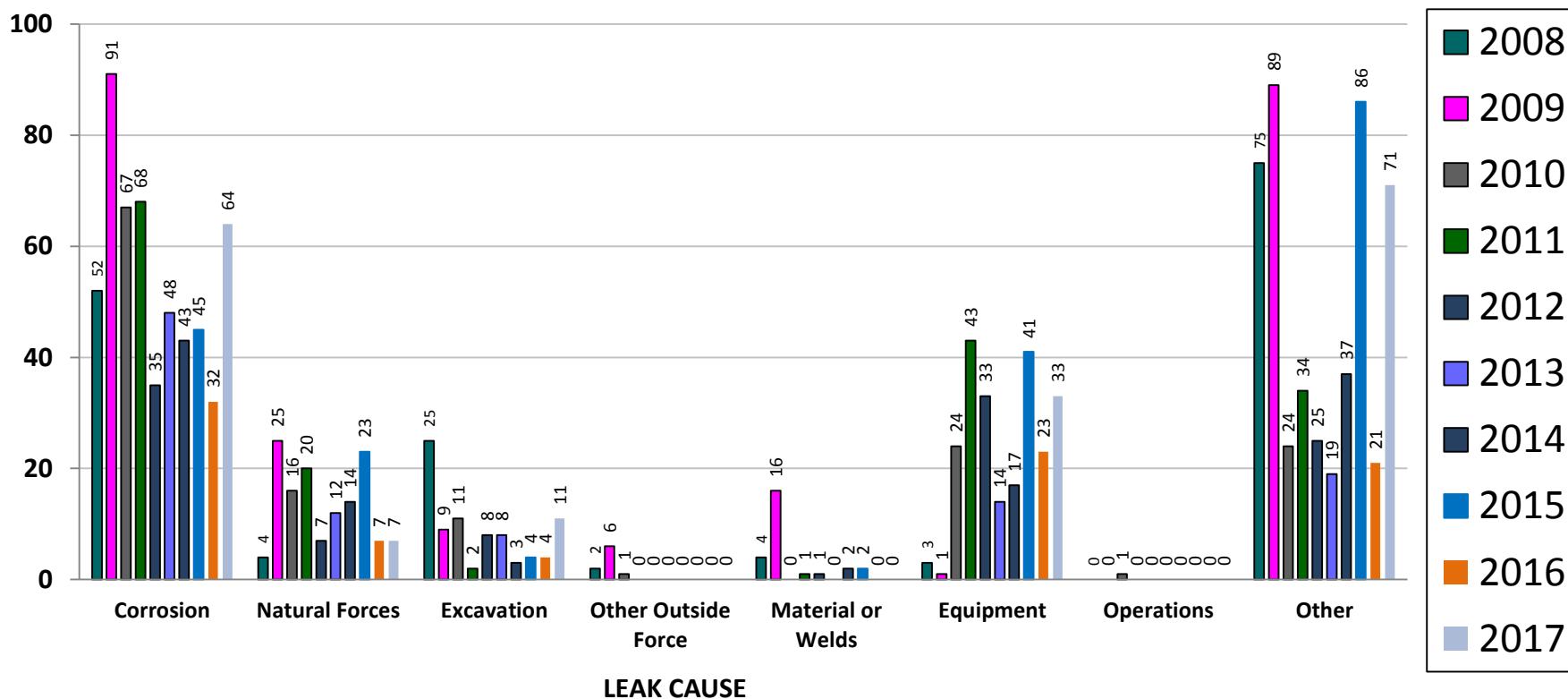
LEAK REPAIRS



2017 SYSTEM INTEGRITY REPORT

CLW MAIN LEAKS REPAIRED COMPARISON BY LEAK CAUSES

LEAK REPAIRS

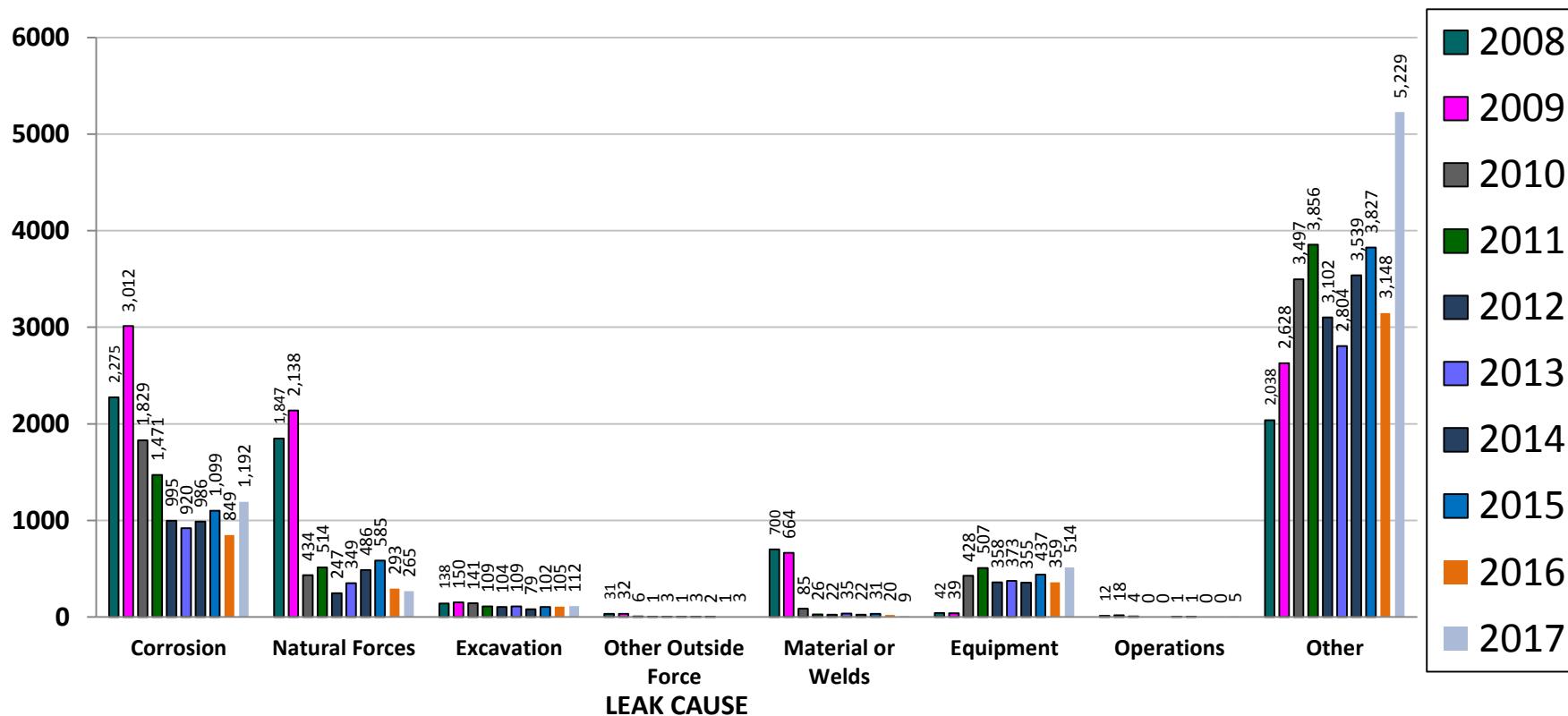


2017 SYSTEM INTEGRITY REPORT

MA

MAIN LEAKS REPAIRED COMPARISON BY LEAK CAUSES

LEAK REPAIRS

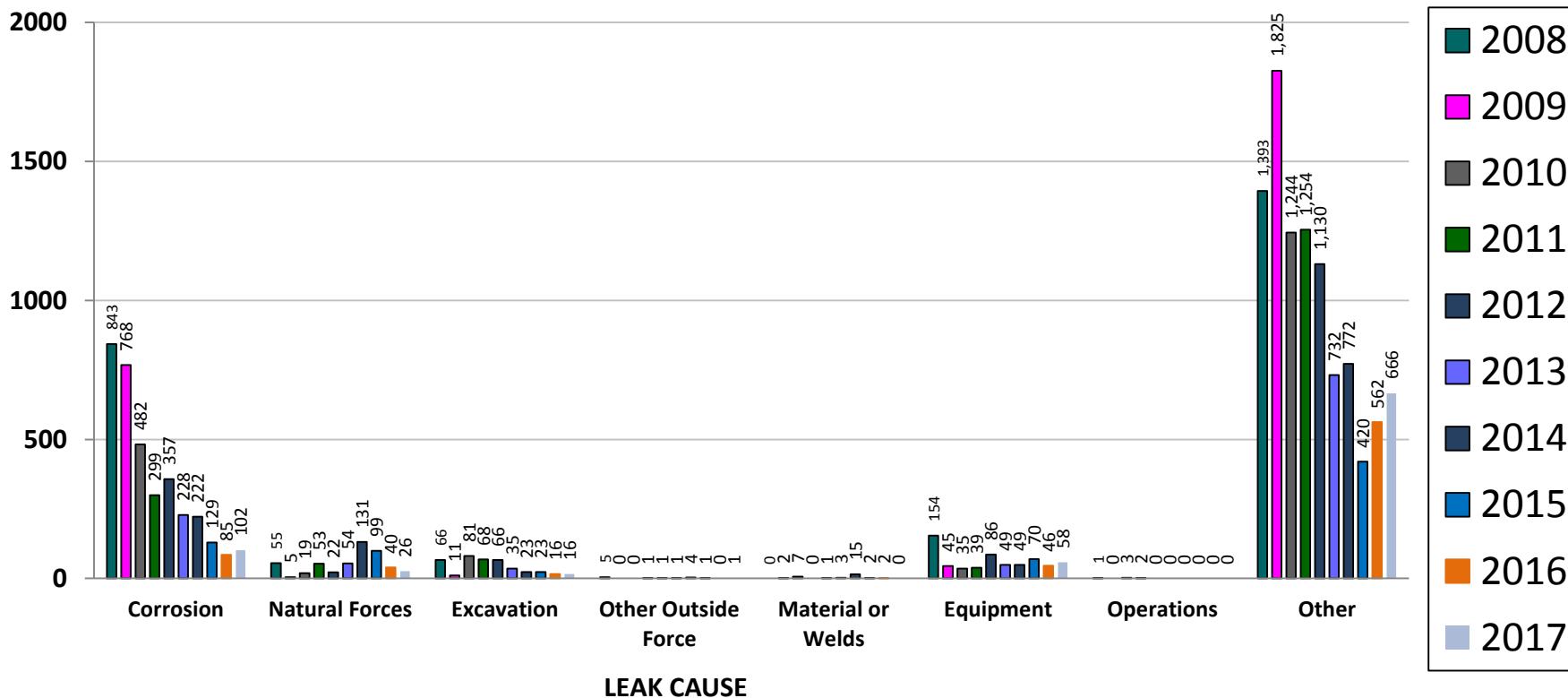


2017 SYSTEM INTEGRITY REPORT

RI

MAIN LEAKS REPAIRED COMPARISON BY LEAK CAUSES

LEAK REPAIRS

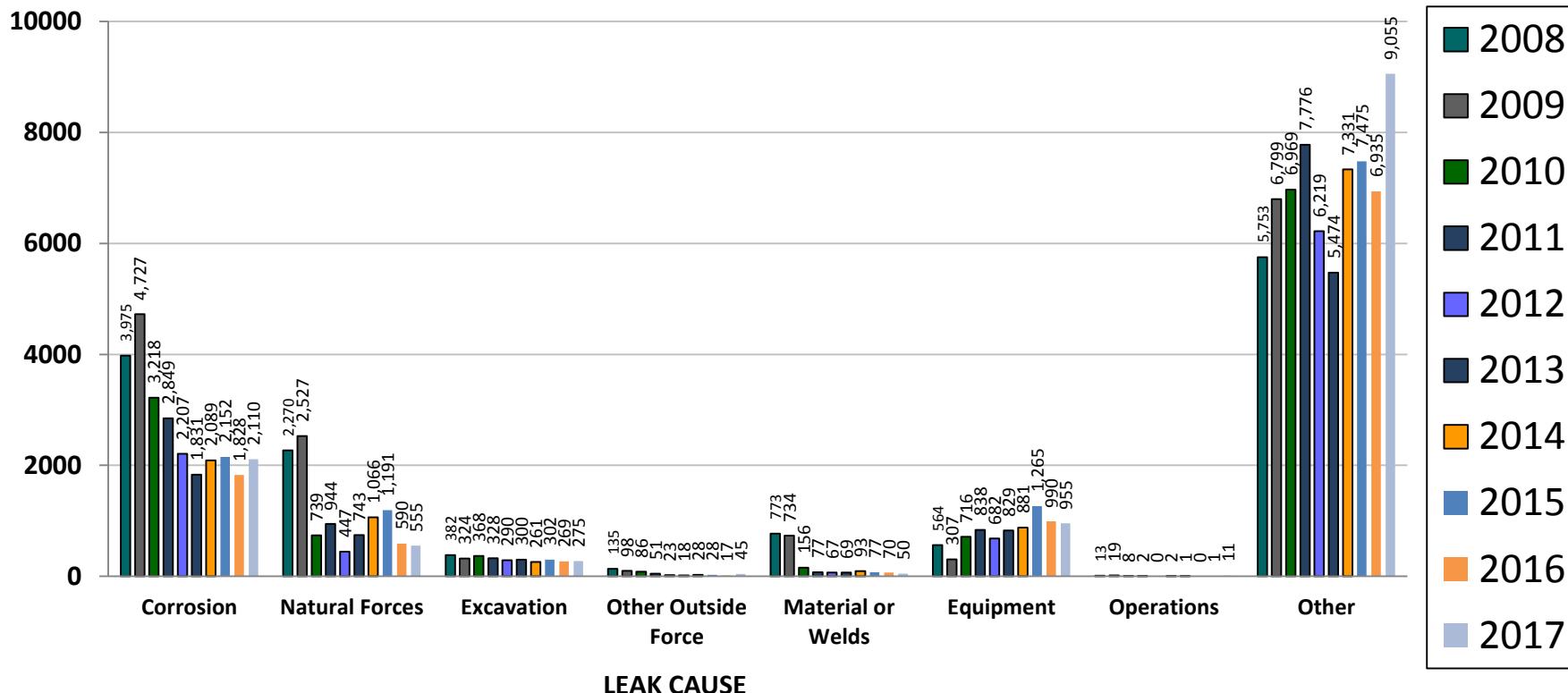


2017 SYSTEM INTEGRITY REPORT

NATIONAL GRID

MAIN LEAKS REPAIRED COMPARISON BY LEAK CAUSES

LEAK REPAIRS

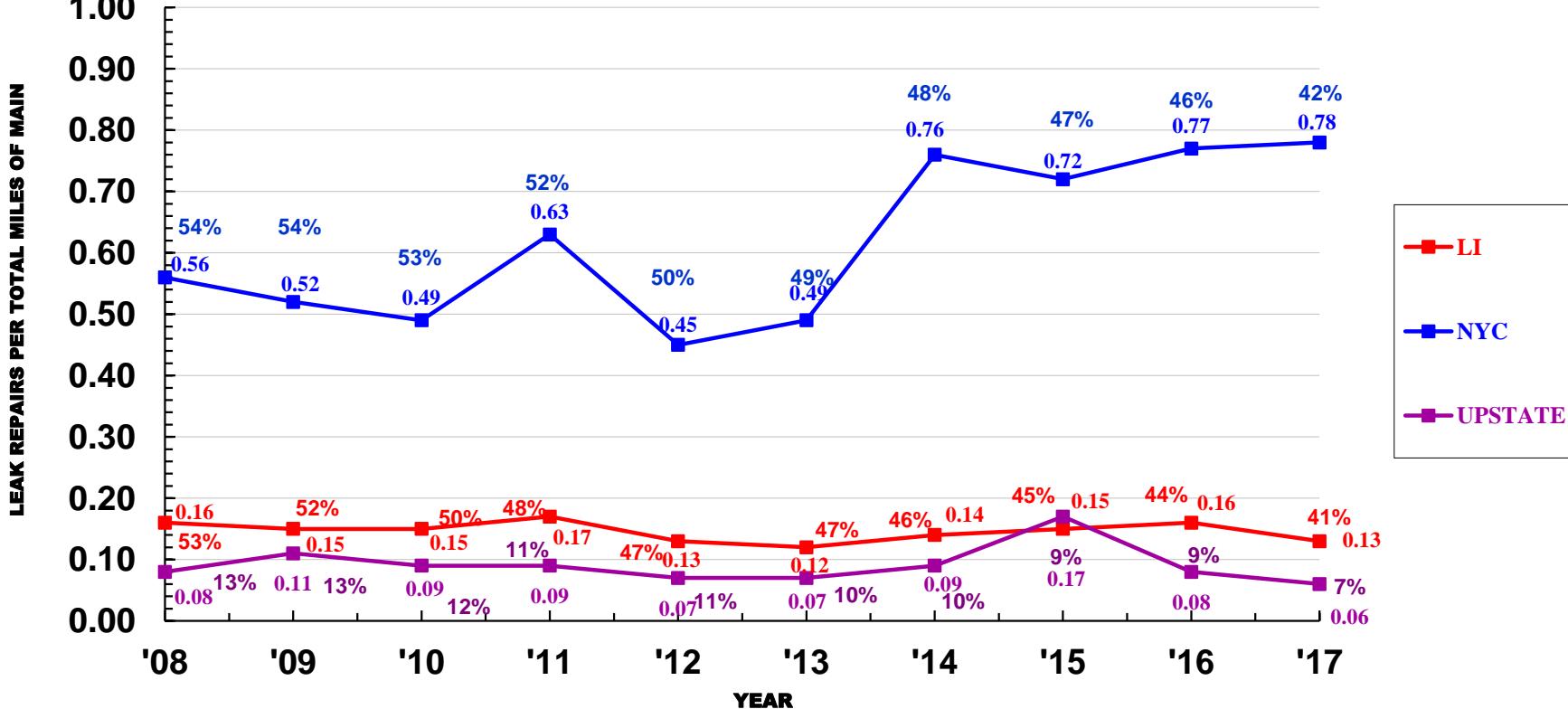


2017 SYSTEM INTEGRITY REPORT

TOTAL MAIN LEAK "RATES"

INCLUDING Damages

PERCENTAGES SHOWN ARE PERCENT OF LEAK-PRONE PIPE



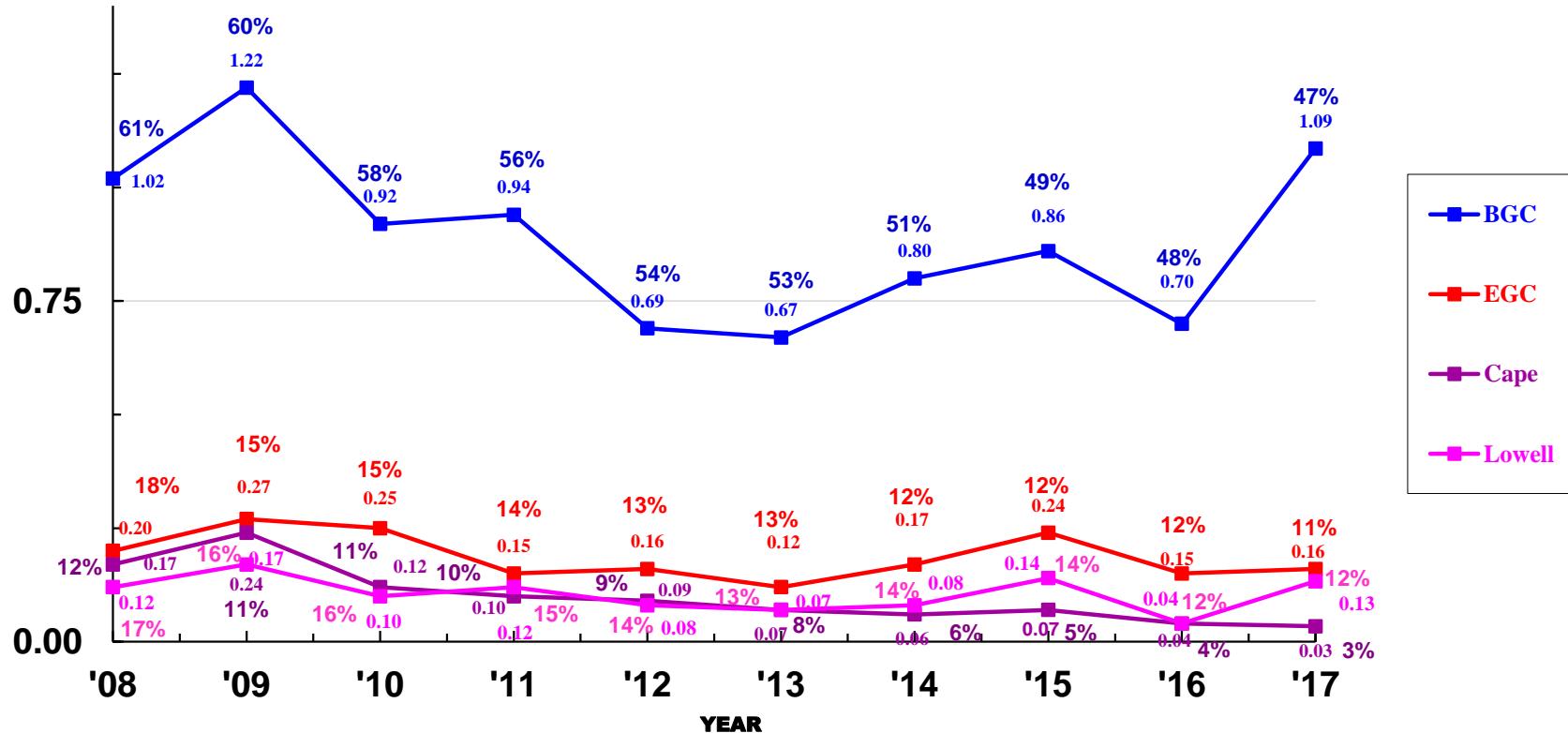
2017 SYSTEM INTEGRITY REPORT

TOTAL MAIN LEAK "RATES"

INCLUDING Damages

PERCENTAGES SHOWN ARE PERCENT OF LEAK-PRONE PIPE

LEAK REPAIRS PER TOTAL MILES OF MAIN

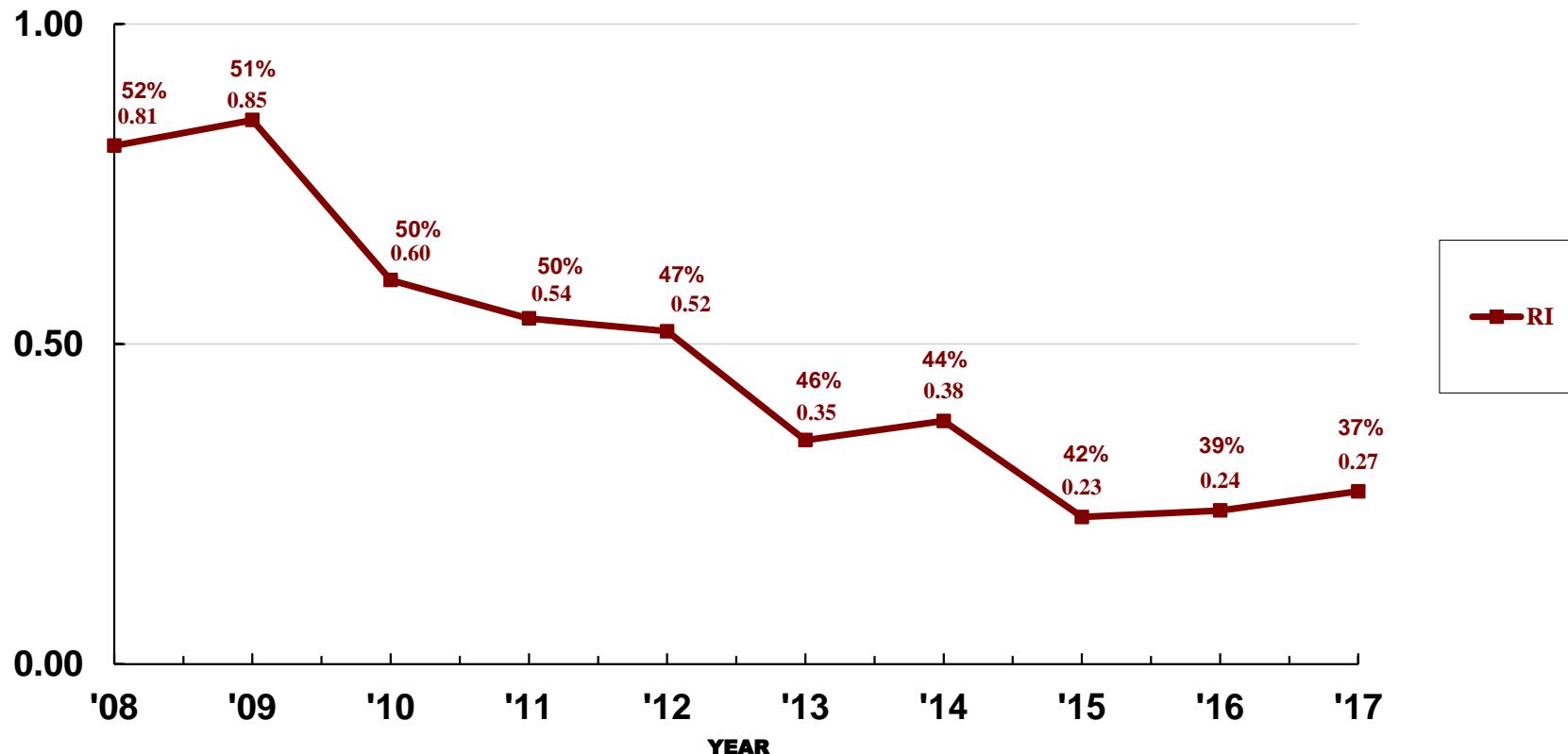


2017 SYSTEM INTEGRITY REPORT

TOTAL MAIN LEAK "RATES"

INCLUDING Damages

PERCENTAGES SHOWN ARE PERCENT OF LEAK-PRONE PIPE

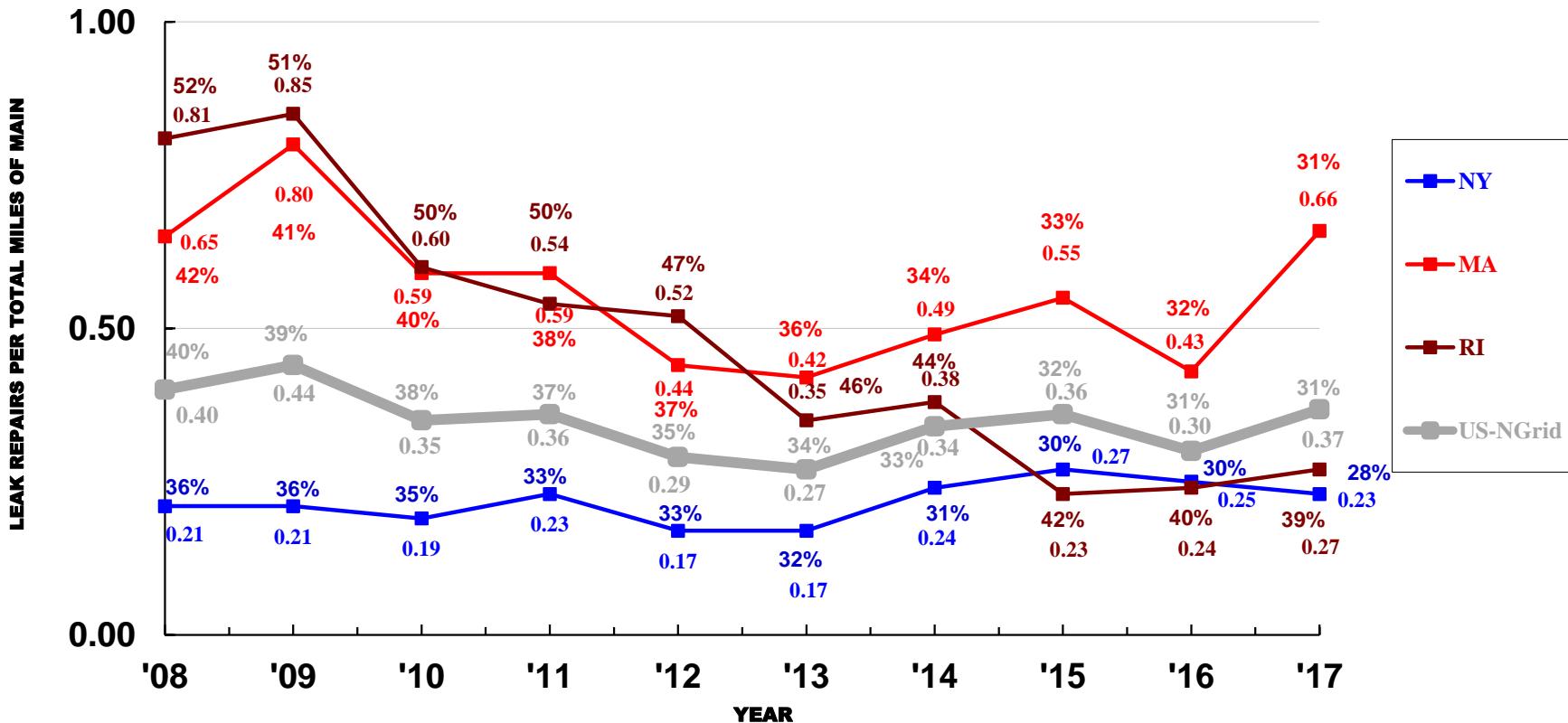


2017 SYSTEM INTEGRITY REPORT

TOTAL MAIN LEAK "RATES"

INCLUDING Damages

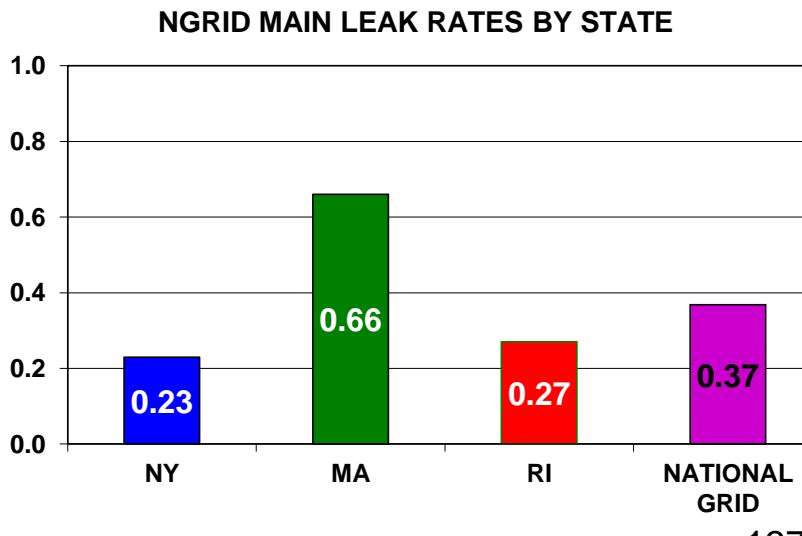
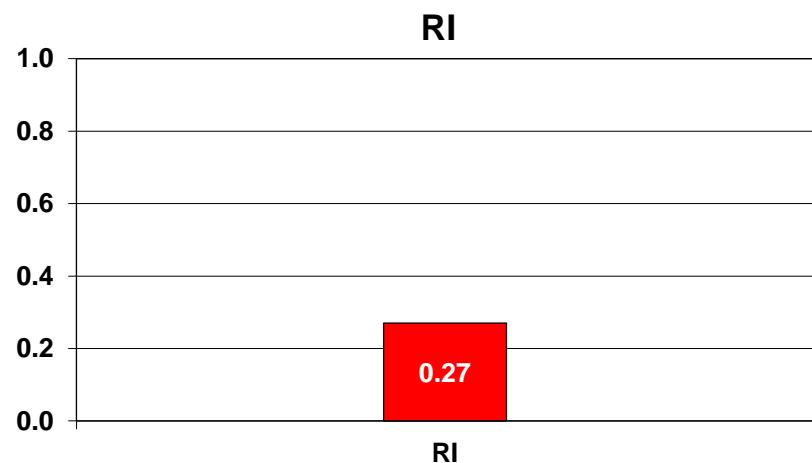
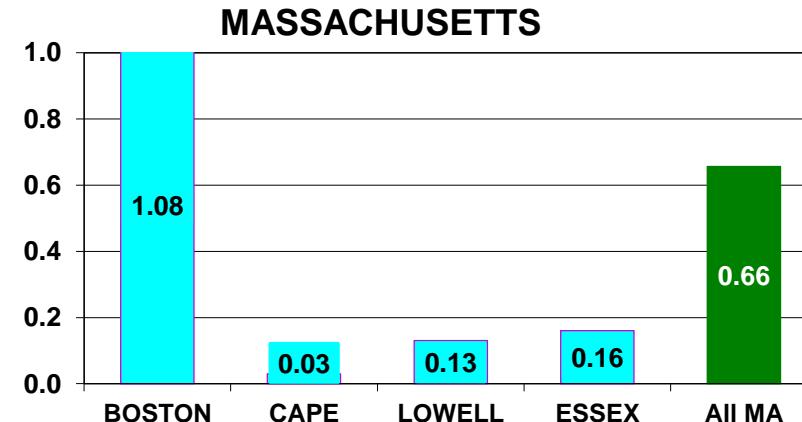
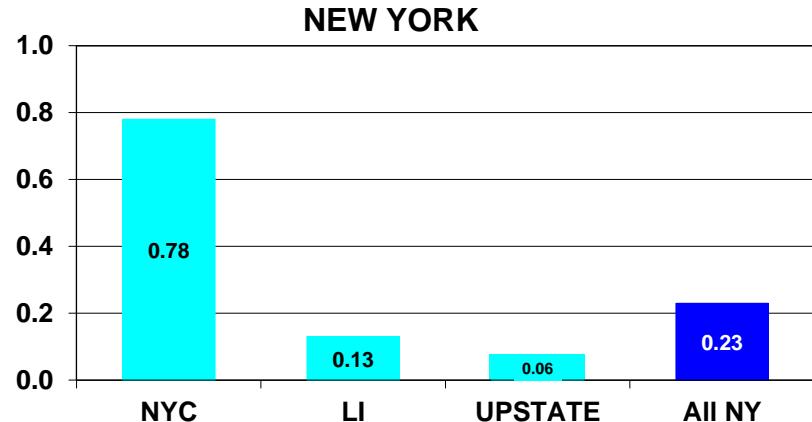
PERCENTAGES SHOWN ARE PERCENT OF LEAK-PRONE PIPE



2017 SYSTEM INTEGRITY REPORT

MAIN LEAK “RATES”

Total Main Leak Repairs (incl. damages) / Mile of Total Main



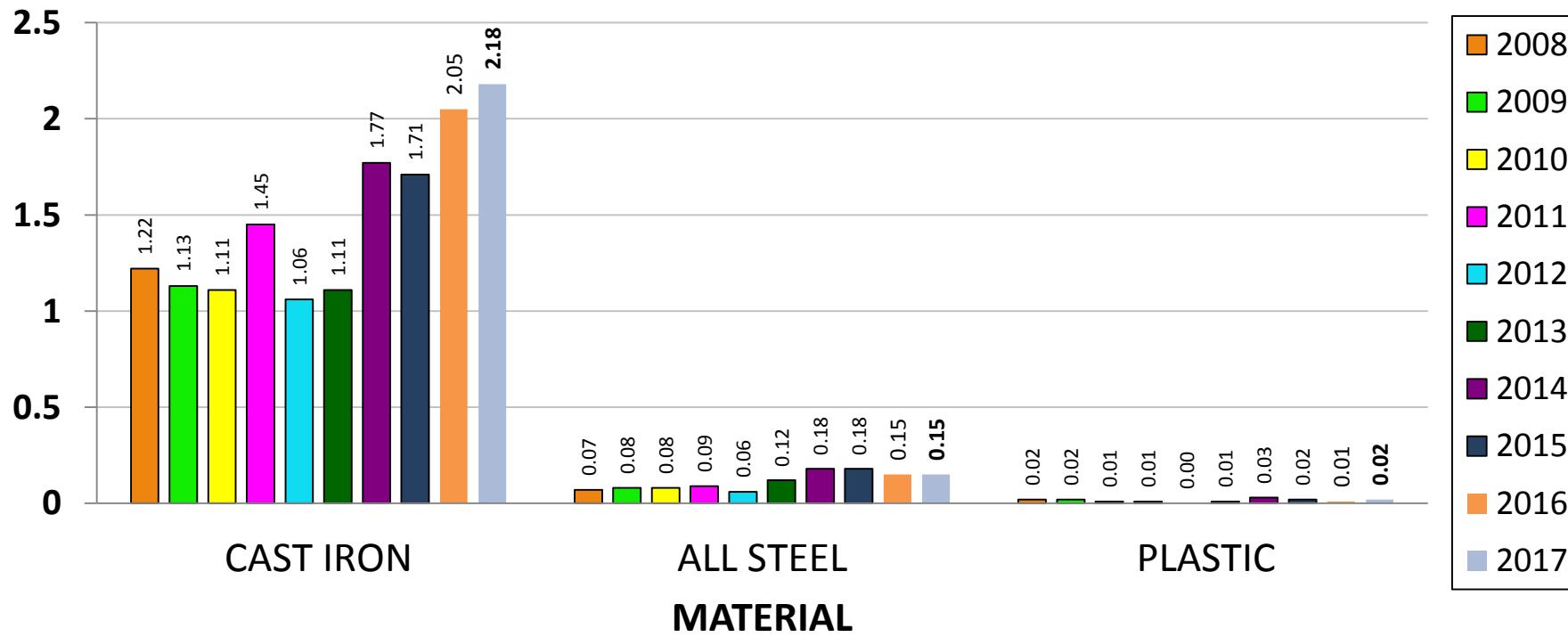
2017 SYSTEM INTEGRITY REPORT

NYC

MAIN LEAK "RATES" COMPARISON BY MATERIAL

**LEAK REPAIRS
PER MILE OF MAIN**

EXCLUDING Damages



COUNTING EACH INDIVIDUAL REPAIR AS A LEAK

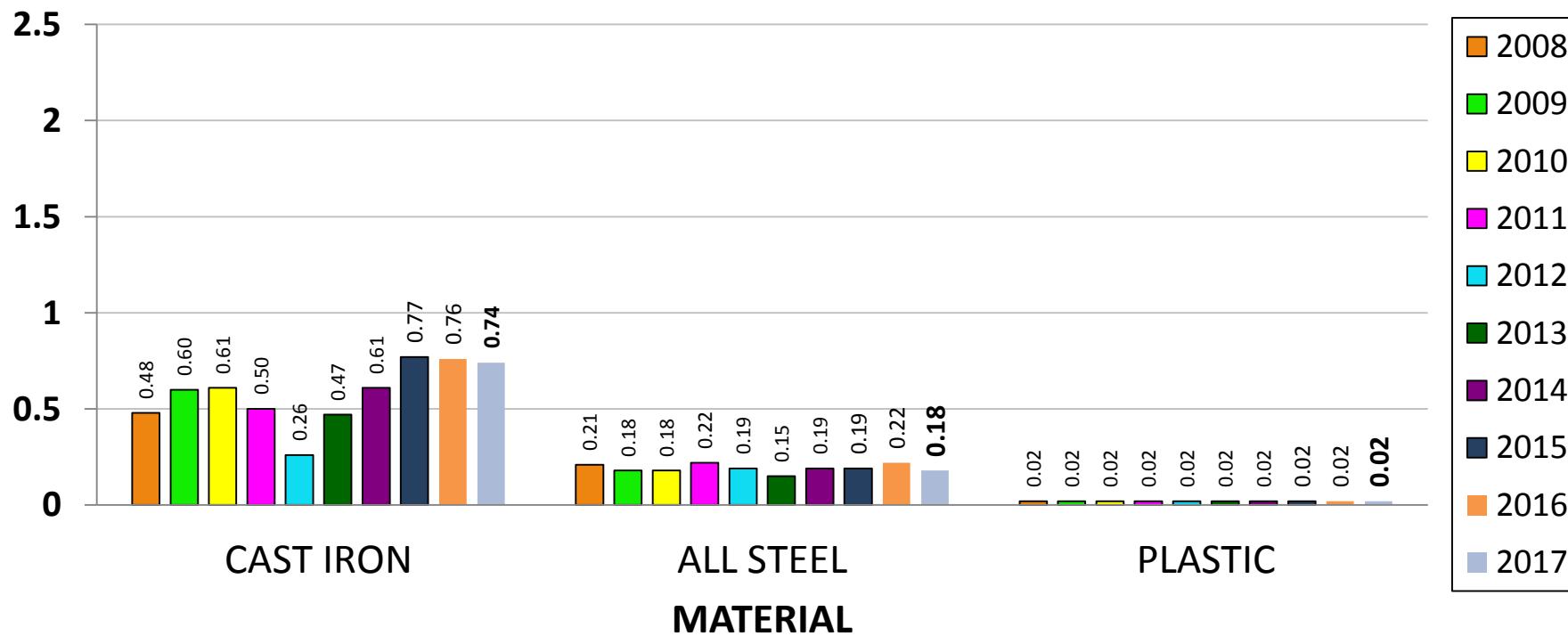
2017 SYSTEM INTEGRITY REPORT



MAIN LEAK "RATES" COMPARISON BY MATERIAL

**LEAK REPAIRS
PER MILE OF MAIN**

EXCLUDING Damages



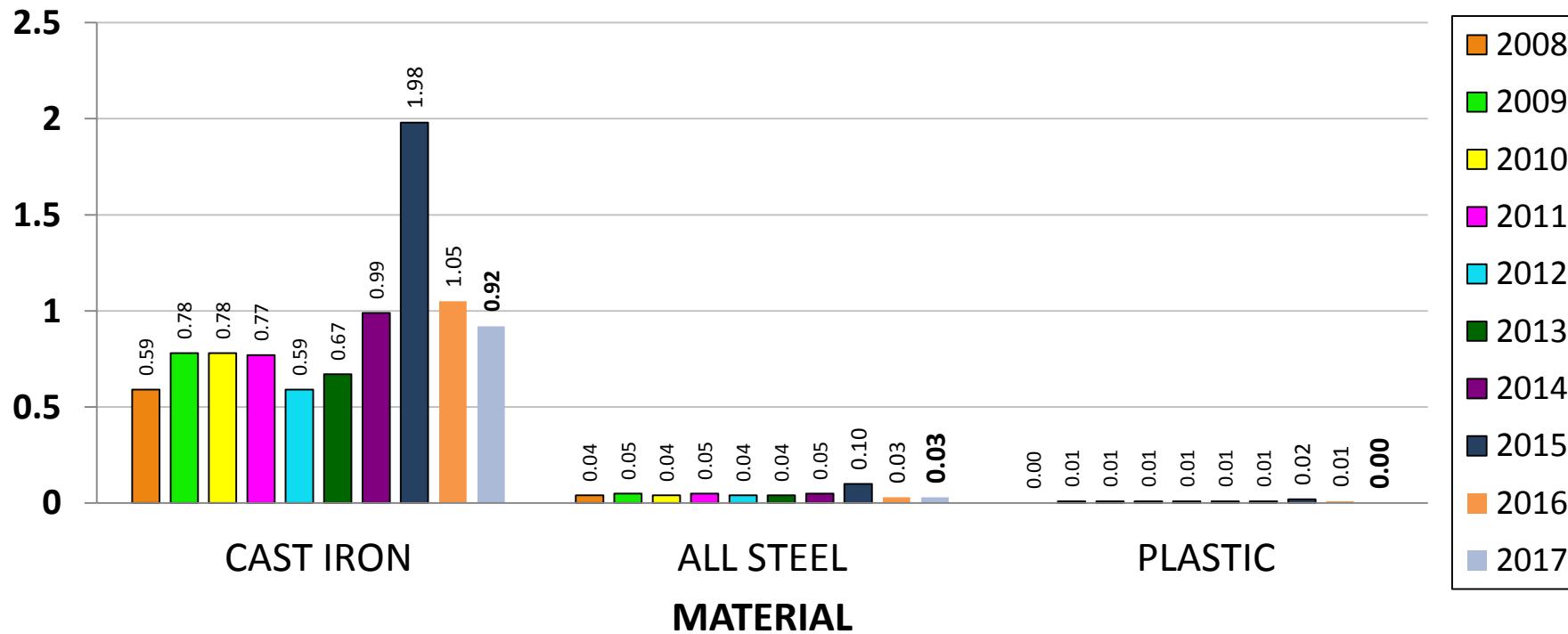
COUNTING EACH INDIVIDUAL REPAIR AS A LEAK

2017 SYSTEM INTEGRITY REPORT

UPSTATE

MAIN LEAK “RATES” COMPARISON BY MATERIAL EXCLUDING Damages

LEAK REPAIRS
PER MILE OF MAIN



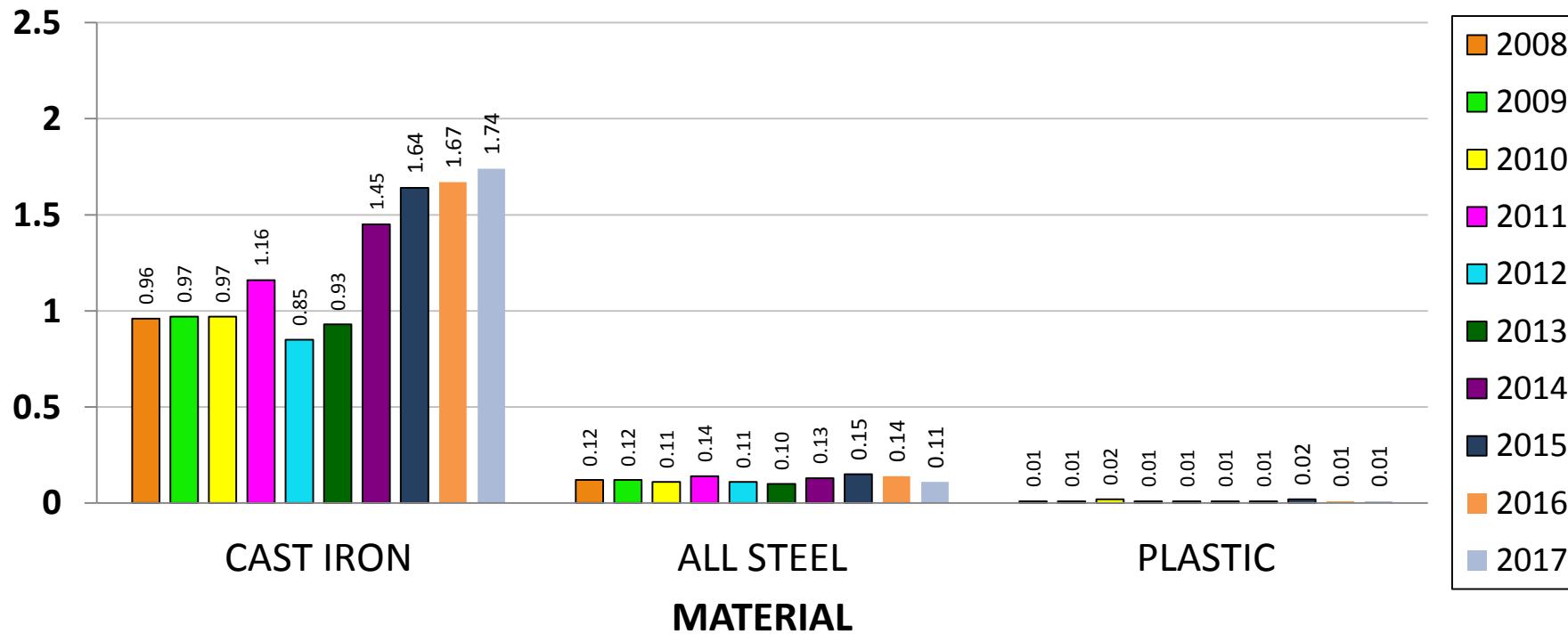
COUNTING EACH INDIVIDUAL REPAIR AS A LEAK

2017 SYSTEM INTEGRITY REPORT

NY State

MAIN LEAK “RATES” COMPARISON BY MATERIAL EXCLUDING Damages

**LEAK REPAIRS
PER MILE OF MAIN**



COUNTING EACH INDIVIDUAL REPAIR AS A LEAK

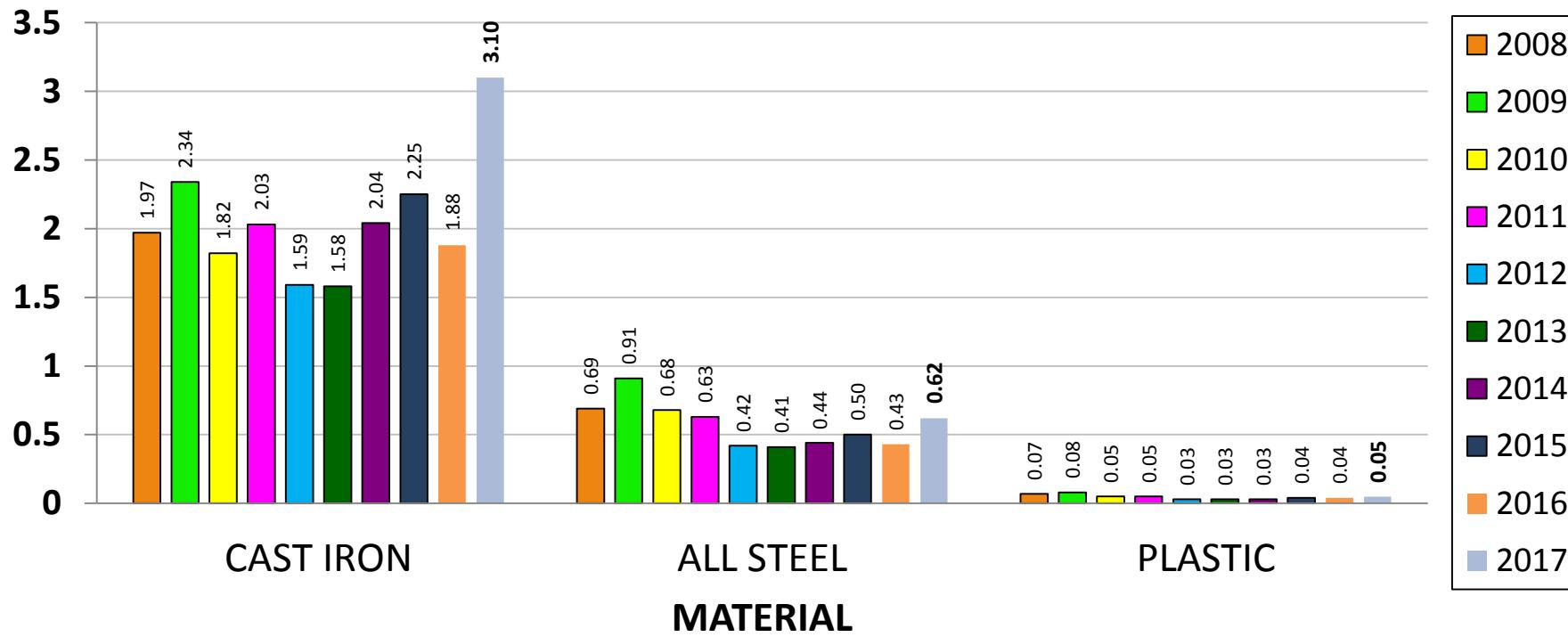
2017 SYSTEM INTEGRITY REPORT

BGC

MAIN LEAK "RATES" *COMPARISON BY MATERIAL*

**LEAK REPAIRS
PER MILE OF MAIN**

EXCLUDING Damages



COUNTING EACH INDIVIDUAL REPAIR AS A LEAK

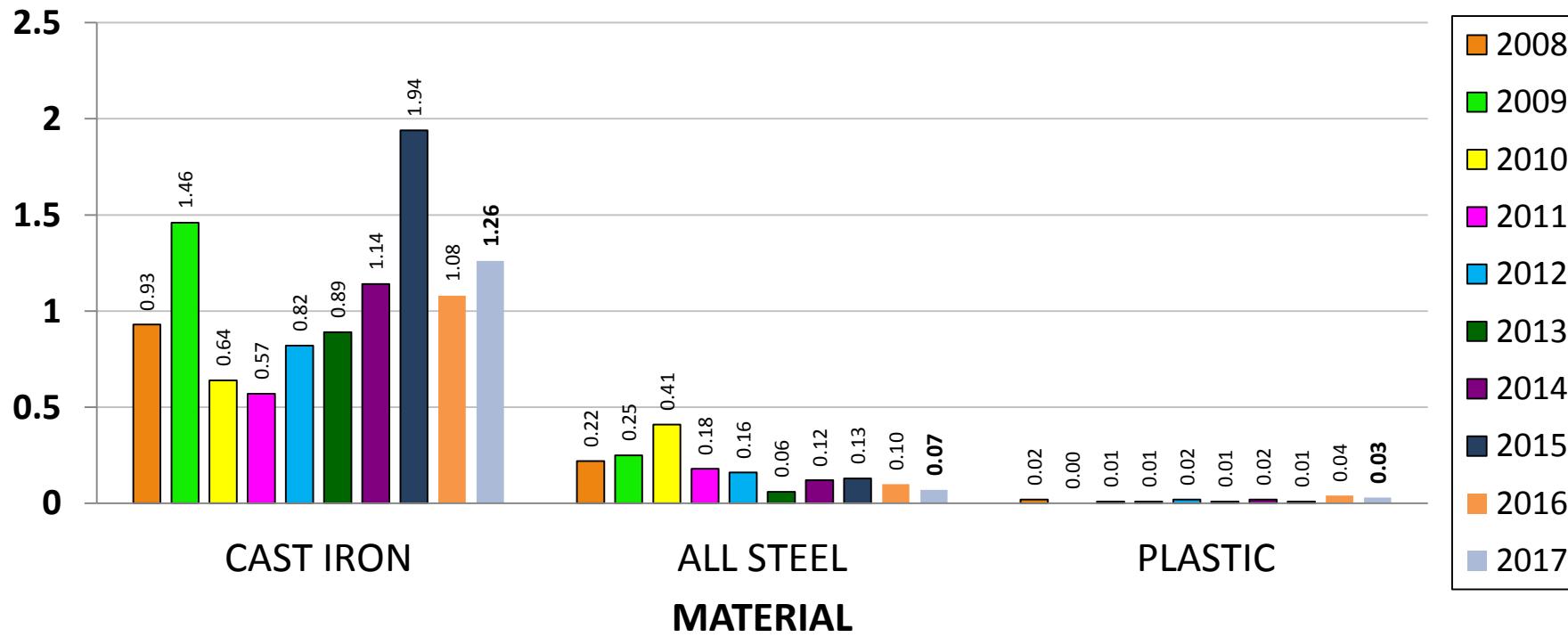
2017 SYSTEM INTEGRITY REPORT

EGC

MAIN LEAK "RATES" COMPARISON BY MATERIAL

**LEAK REPAIRS
PER MILE OF MAIN**

EXCLUDING Damages



COUNTING EACH INDIVIDUAL REPAIR AS A LEAK

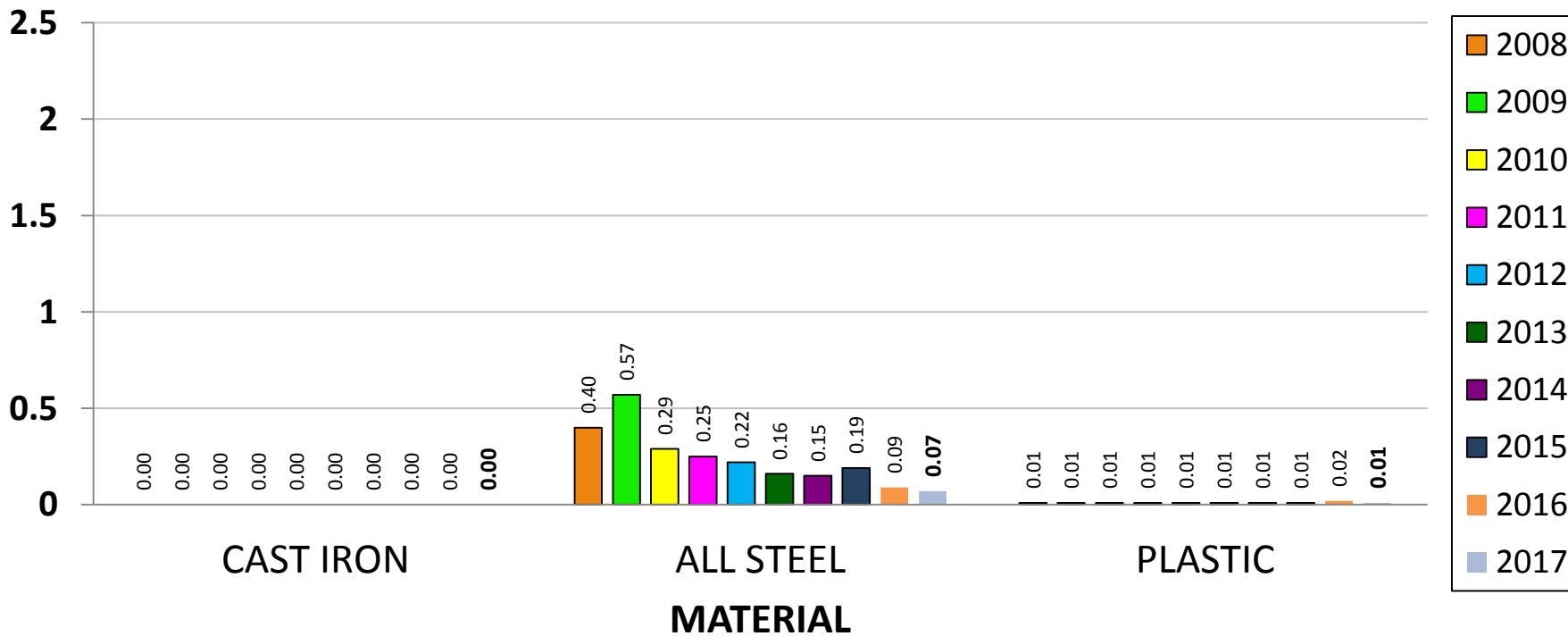
2017 SYSTEM INTEGRITY REPORT

CAPE

MAIN LEAK "RATES" COMPARISON BY MATERIAL

**LEAK REPAIRS
PER MILE OF MAIN**

EXCLUDING Damages



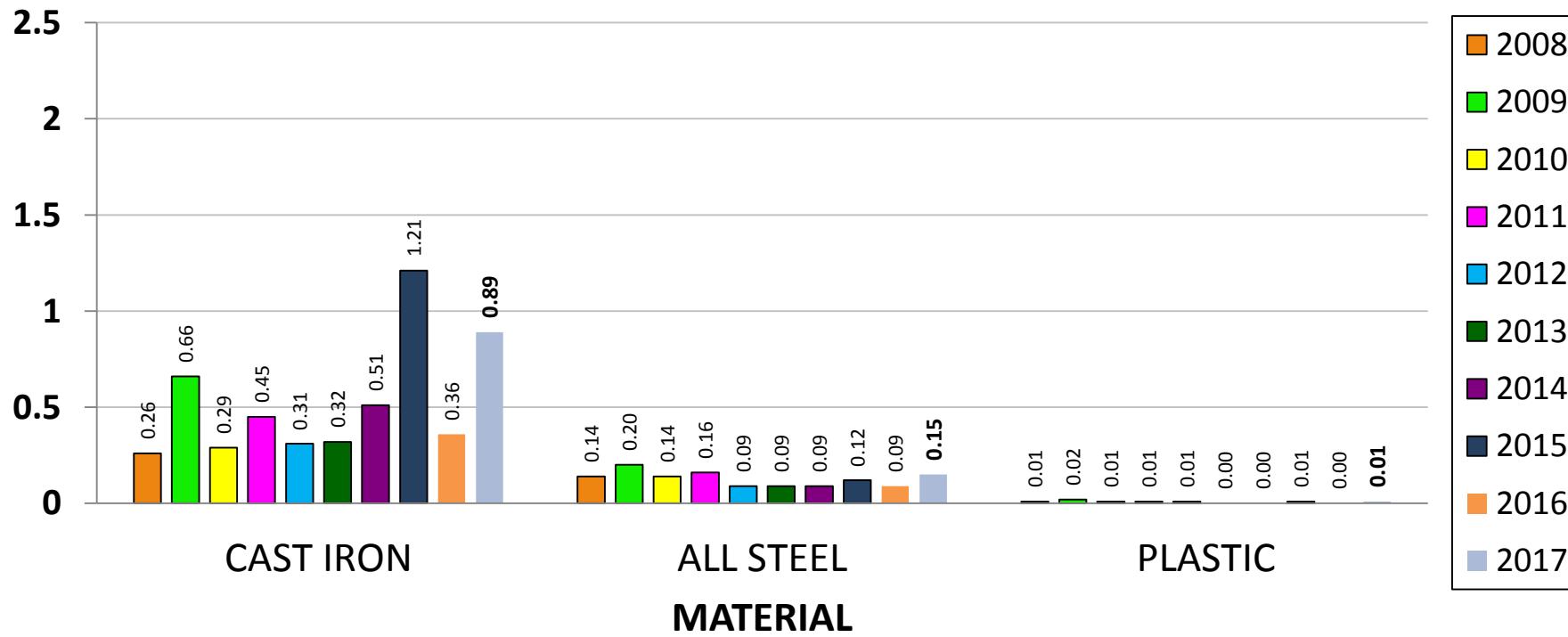
COUNTING EACH INDIVIDUAL REPAIR AS A LEAK

2017 SYSTEM INTEGRITY REPORT

LOWELL

MAIN LEAK "RATES" COMPARISON BY MATERIAL EXCLUDING Damages

**LEAK REPAIRS
PER MILE OF MAIN**



COUNTING EACH INDIVIDUAL REPAIR AS A LEAK

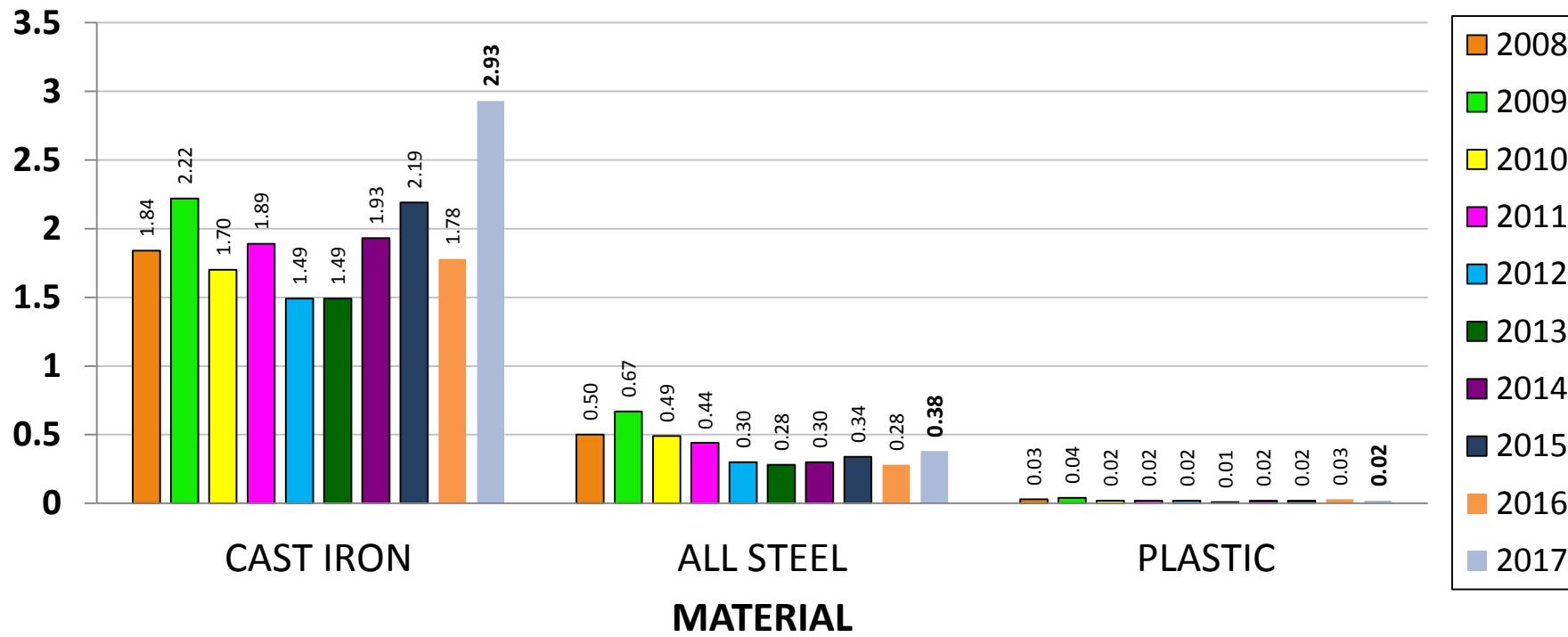
2017 SYSTEM INTEGRITY REPORT

MA

MAIN LEAK "RATES" COMPARISON BY MATERIAL

**LEAK REPAIRS
PER MILE OF MAIN**

EXCLUDING Damages



COUNTING EACH INDIVIDUAL REPAIR AS A LEAK

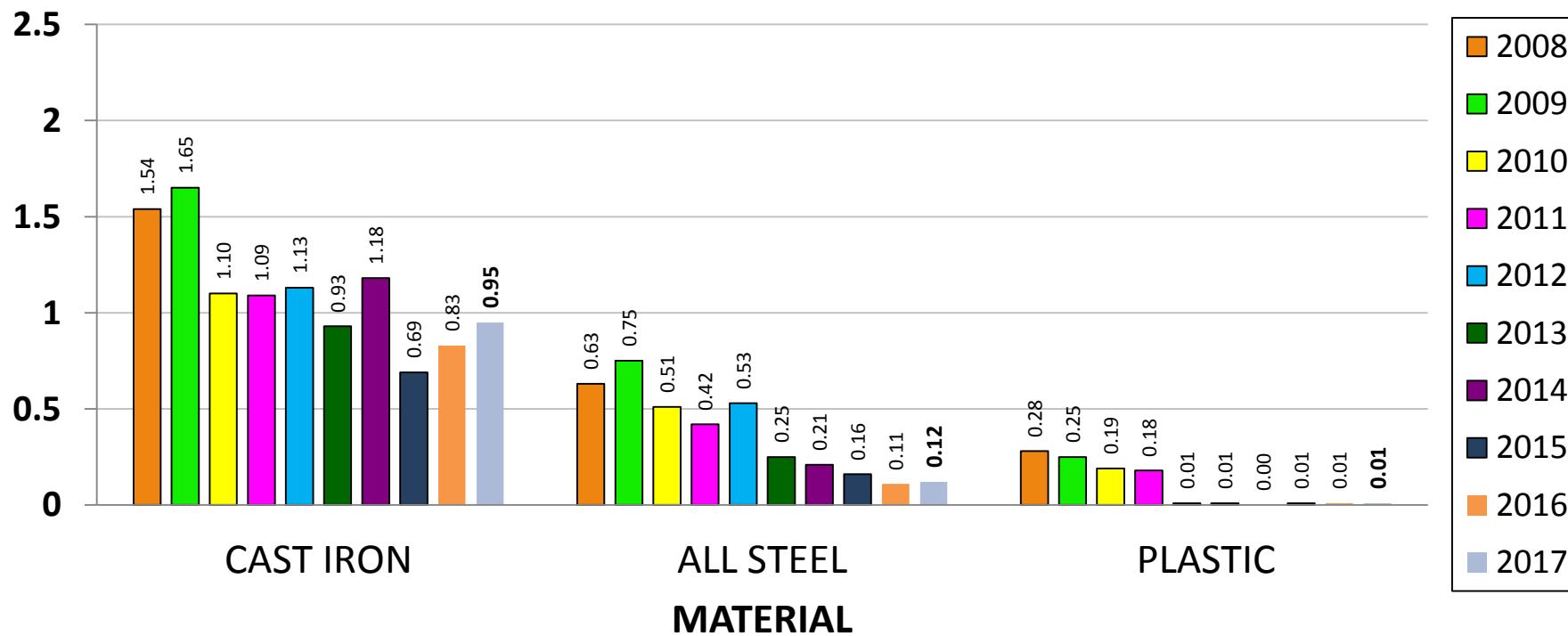
2017 SYSTEM INTEGRITY REPORT

RI

MAIN LEAK "RATES" *COMPARISON BY MATERIAL*

**LEAK REPAIRS
PER MILE OF MAIN**

EXCLUDING Damages



COUNTING EACH INDIVIDUAL REPAIR AS A LEAK

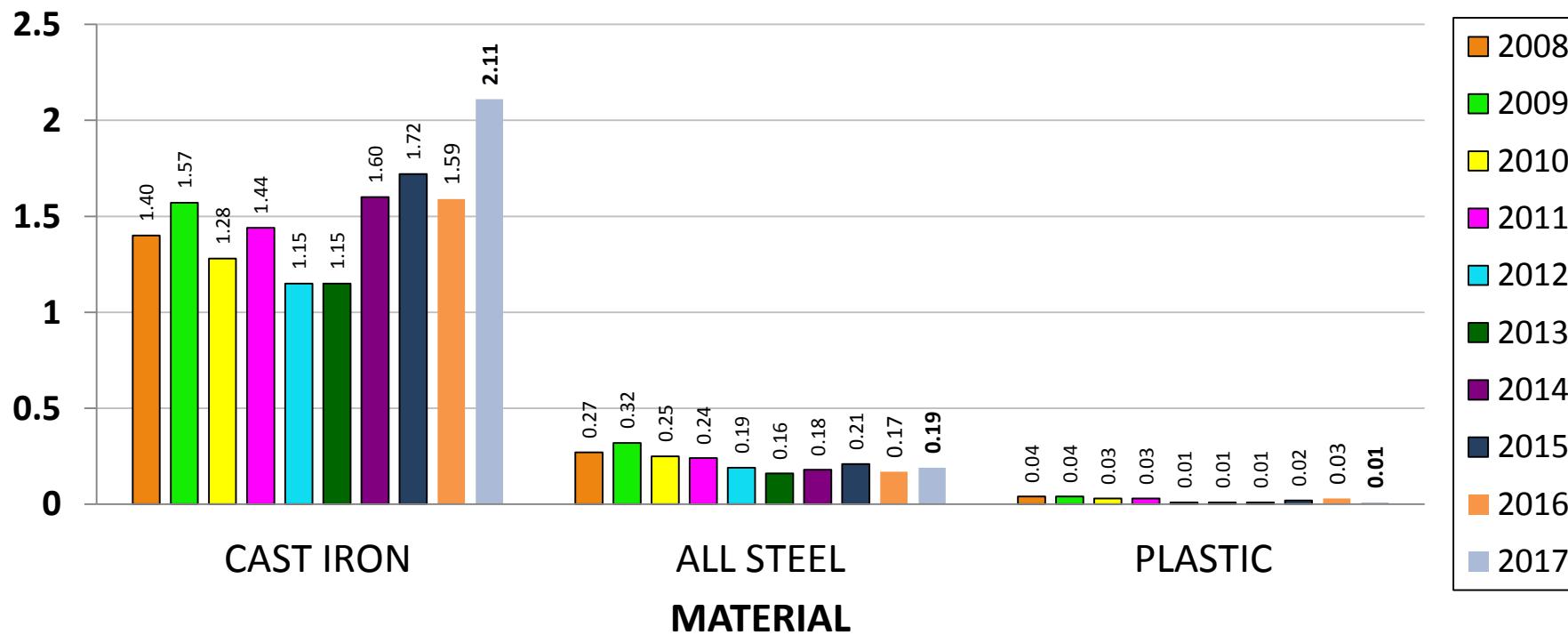
2017 SYSTEM INTEGRITY REPORT

US-NGrid

MAIN LEAK "RATES" COMPARISON BY MATERIAL

**LEAK REPAIRS
PER MILE OF MAIN**

EXCLUDING Damages



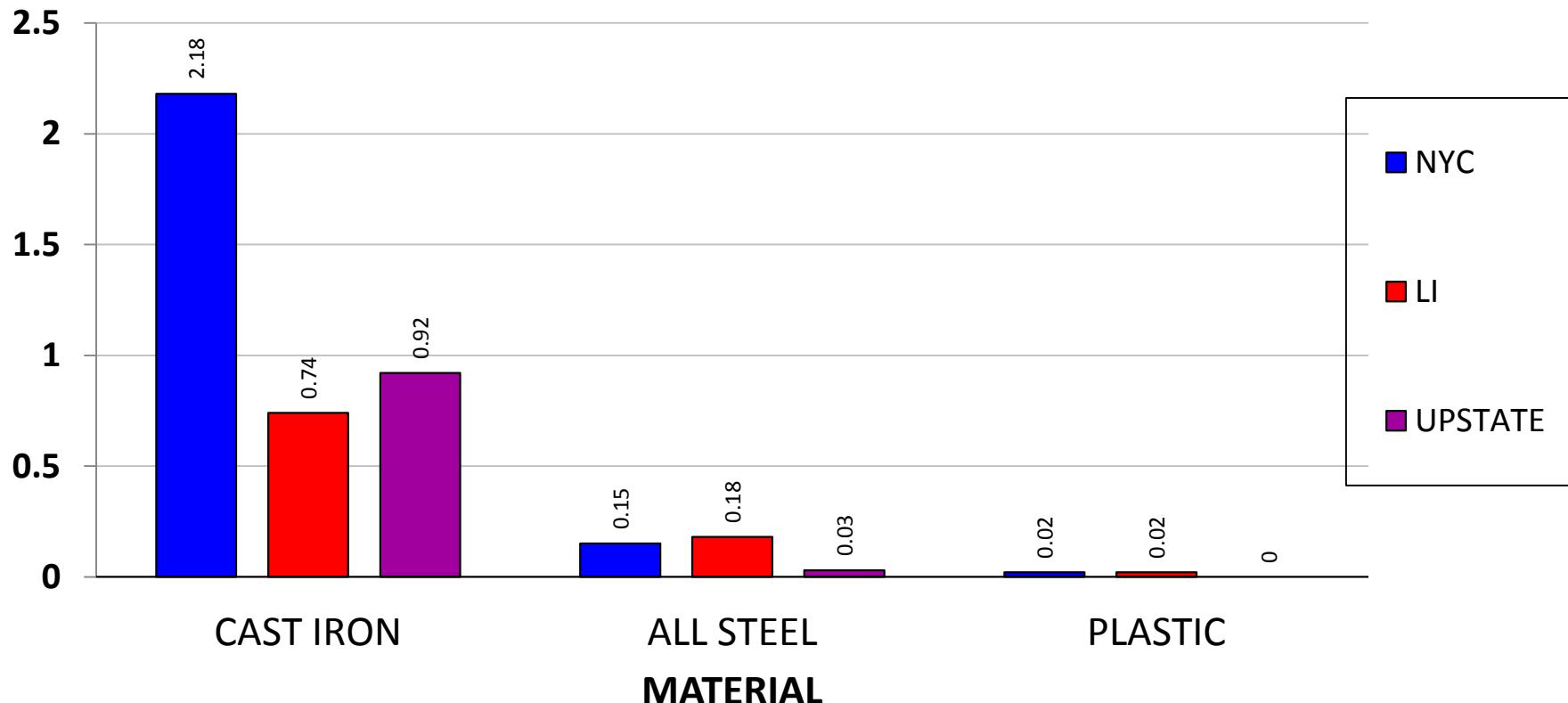
COUNTING EACH INDIVIDUAL REPAIR AS A LEAK

2017 SYSTEM INTEGRITY REPORT

NY State

MAIN LEAK "RATES" COMPARISON BY MATERIAL EXCLUDING Damages

LEAK REPAIRS
PER MILE OF MAIN



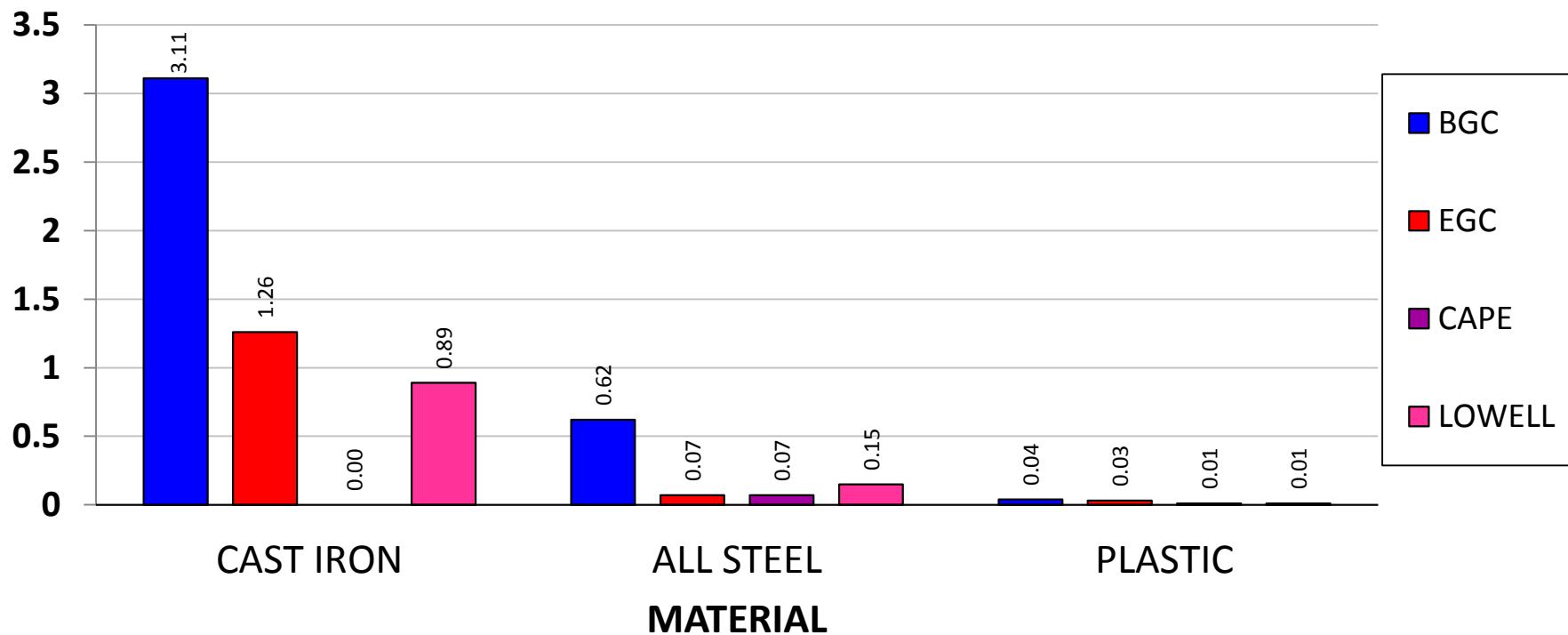
2017 SYSTEM INTEGRITY REPORT

MA

MAIN LEAK "RATES" *COMPARISON BY MATERIAL*

EXCLUDING Damages

**LEAK REPAIRS
PER MILE OF MAIN**

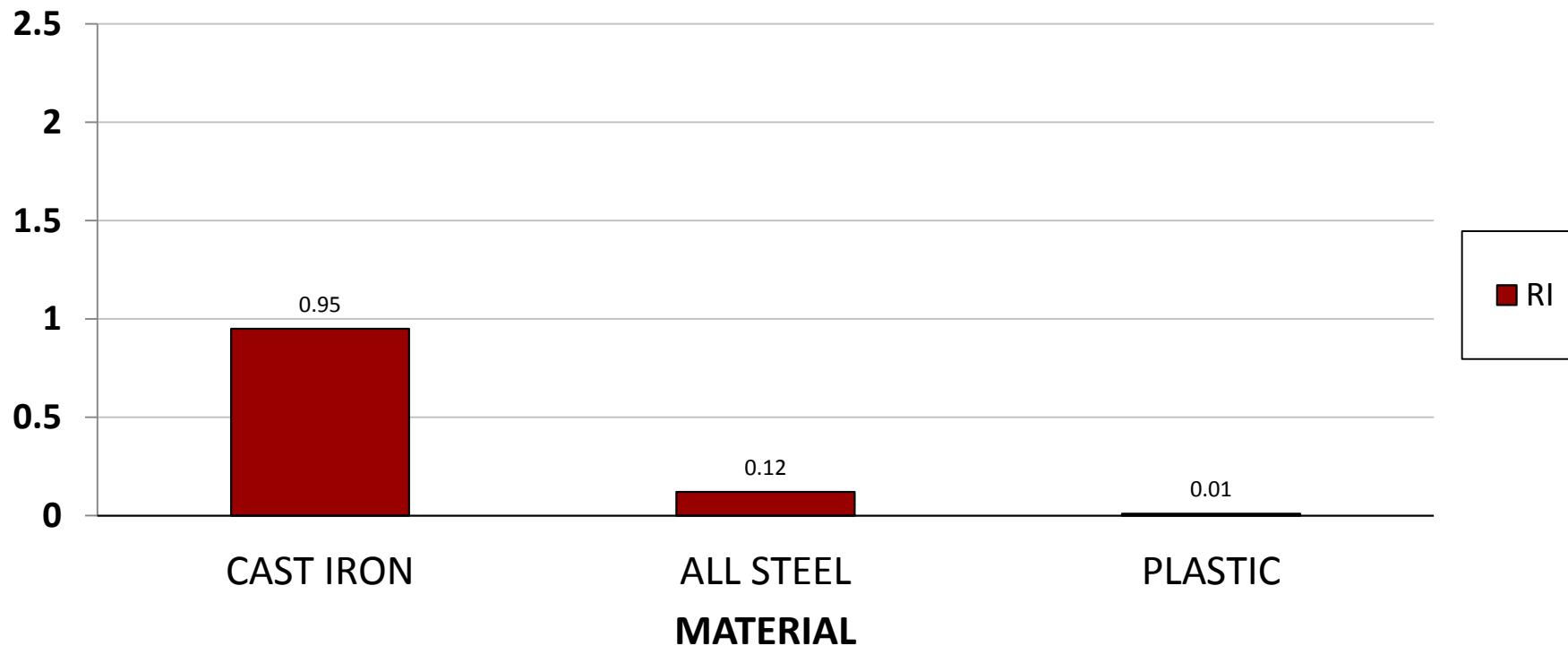


2017 SYSTEM INTEGRITY REPORT

RI

MAIN LEAK "RATES" COMPARISON BY MATERIAL EXCLUDING Damages

**LEAK REPAIRS
PER MILE OF MAIN**

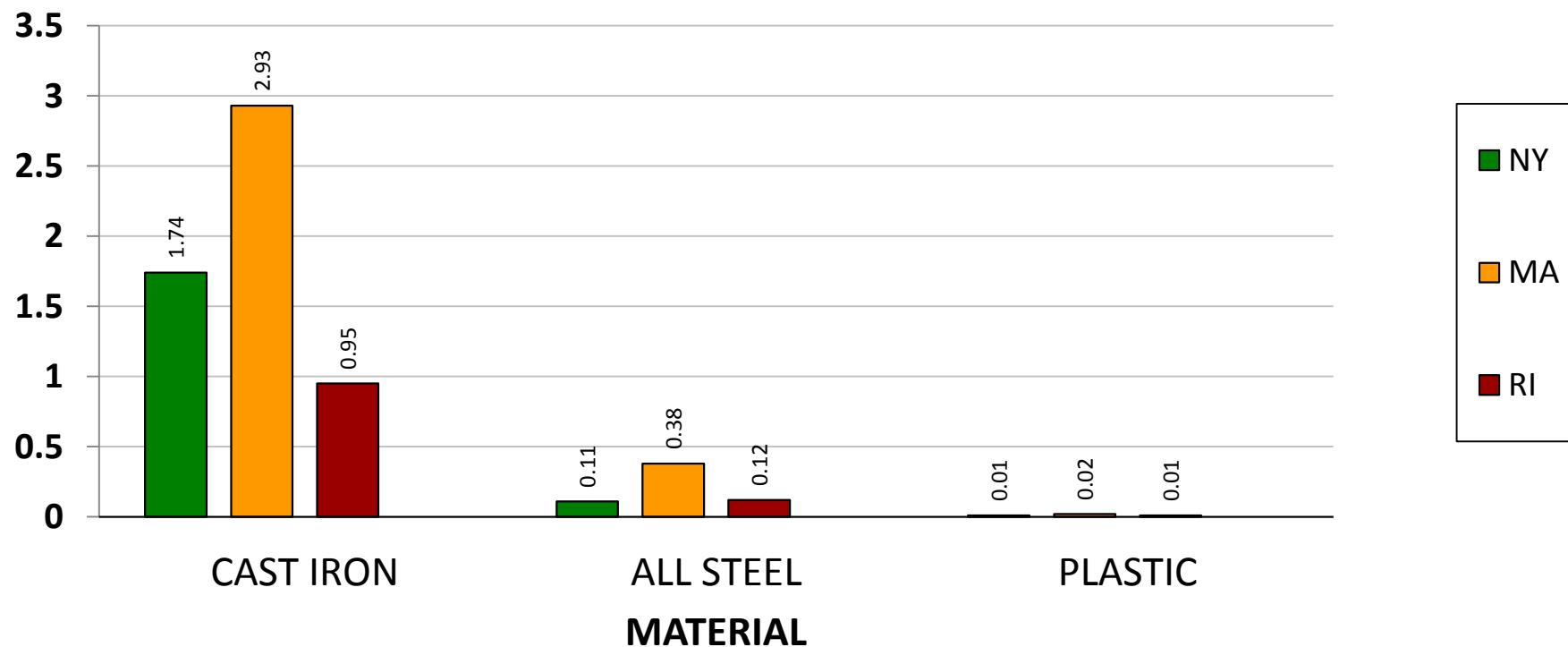


2017 SYSTEM INTEGRITY REPORT

US NGrid

MAIN LEAK "RATES" COMPARISON BY MATERIAL EXCLUDING Damages

LEAK REPAIRS
PER MILE OF MAIN



2017 SYSTEM INTEGRITY REPORT

A CLOSER LOOK AT CAST IRON MAINS

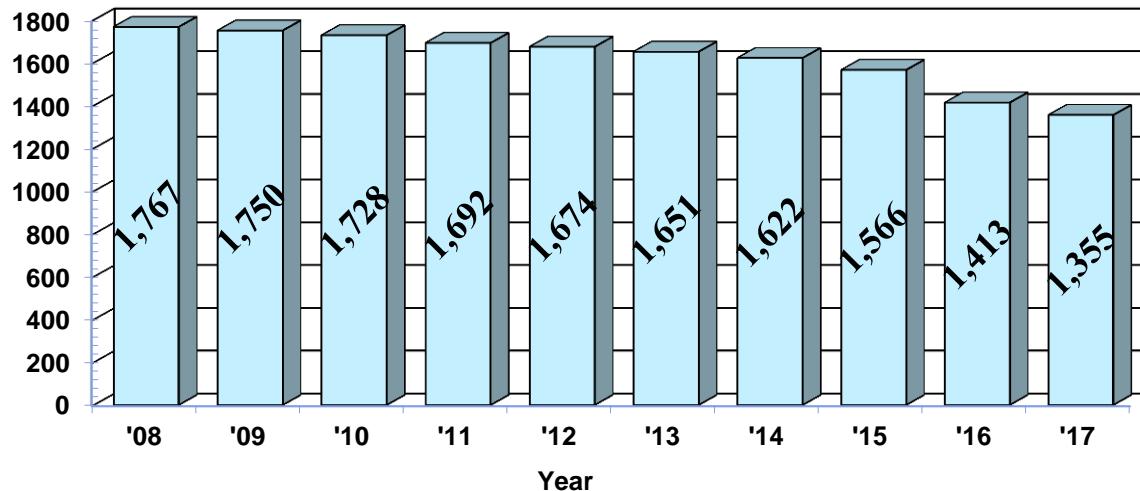


2017 SYSTEM INTEGRITY REPORT

NYC

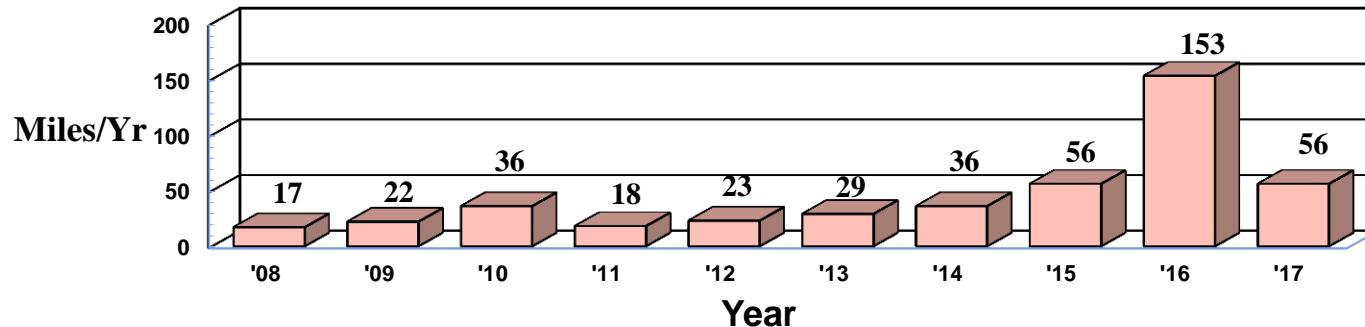
DOT-
Reported
Pipe
Inventories
Miles

CAST IRON MAIN INVENTORY



CAST IRON ATTRITION RATE

Avg 10-Yr Attrition Rate: 44.60 Miles/Year (3.29%)

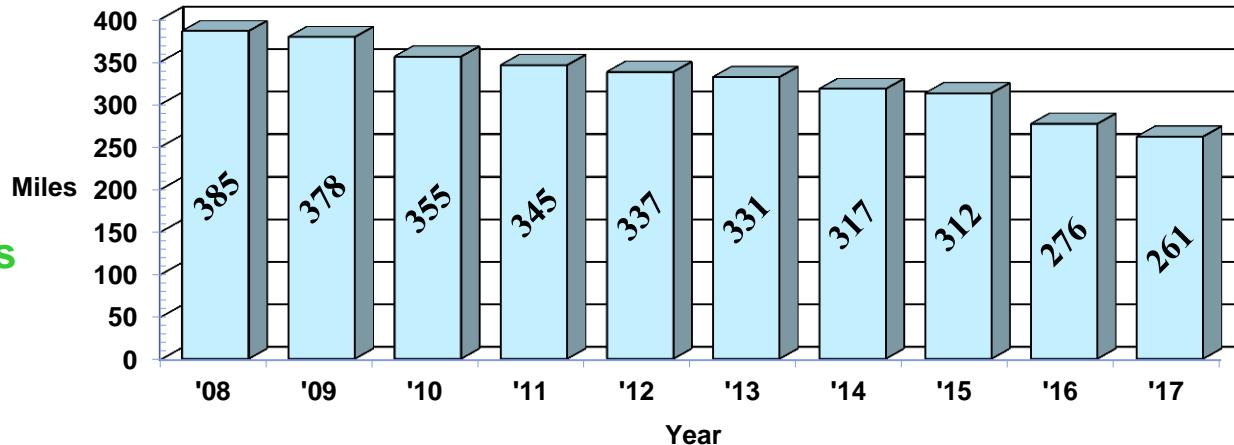


2017 SYSTEM INTEGRITY REPORT



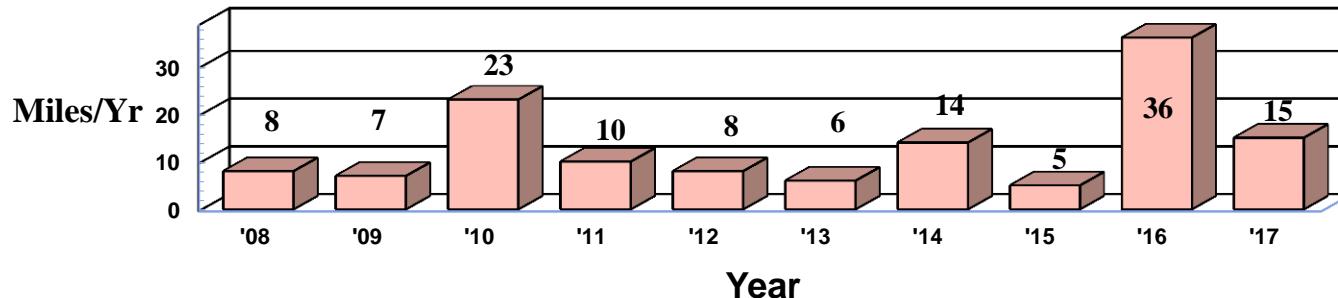
DOT-
Reported
Pipe
Inventories

CAST IRON MAIN INVENTORY



CAST IRON ATTRITION RATE

Avg 10-Yr Attrition Rate: 13.20 Miles/Year (5.06%)

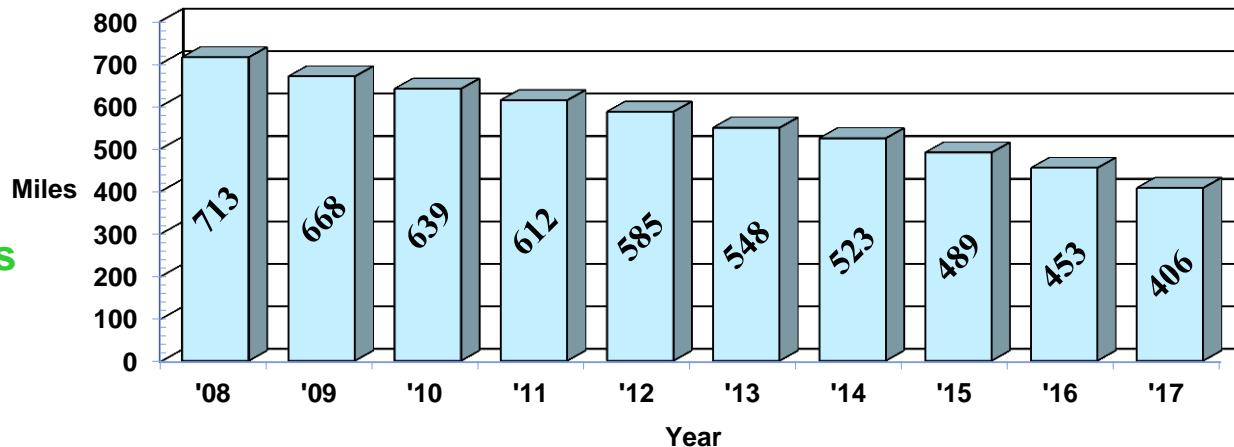


2017 SYSTEM INTEGRITY REPORT

UPSTATE

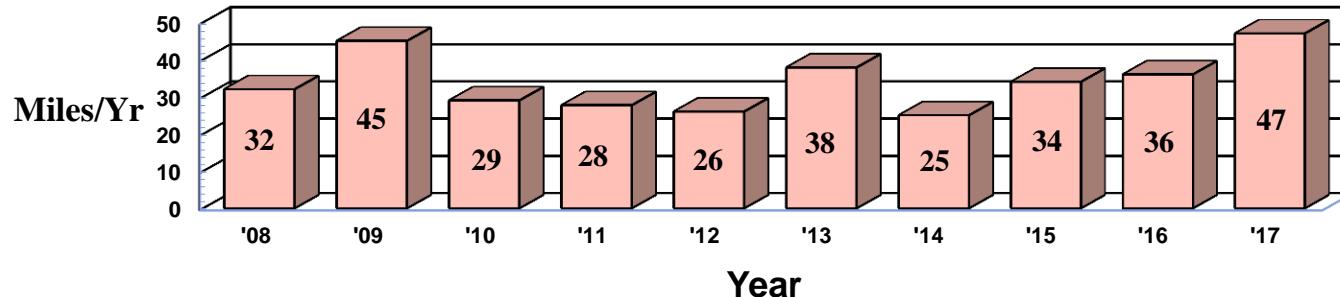
CAST IRON MAIN INVENTORY

DOT-
Reported
Pipe
Inventories



CAST IRON ATTRITION RATE

Avg 10-Yr Attrition Rate: 33.96 Miles/Year (8.36%)

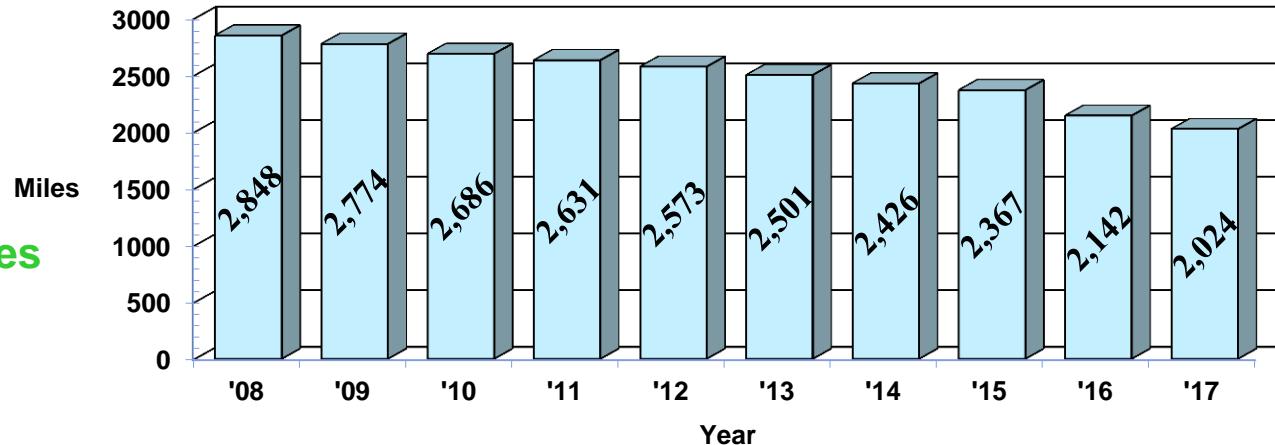


2017 SYSTEM INTEGRITY REPORT

NY STATE

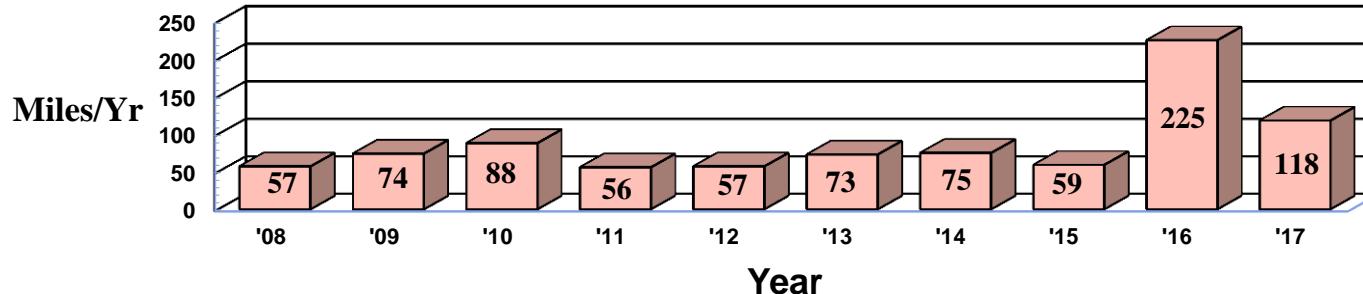
CAST IRON MAIN INVENTORY

DOT-
Reported
Pipe
Inventories



CAST IRON ATTRITION RATE

Avg 10-Yr Attrition Rate: 88.14 Miles/Year (4.36%)

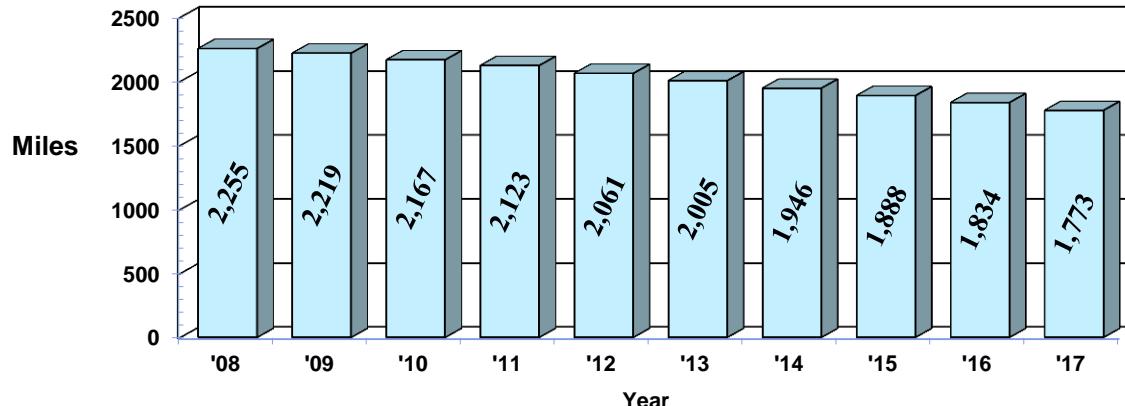


2017 SYSTEM INTEGRITY REPORT

BGC

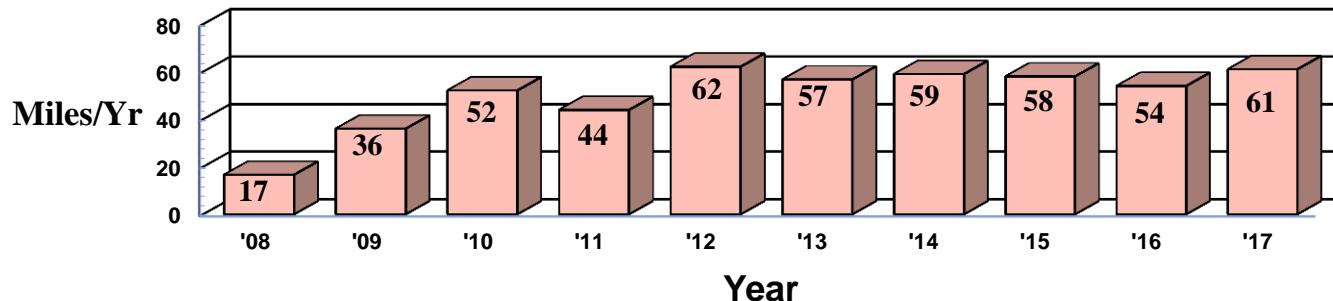
DOT-
Reported
Pipe
Inventories

CAST IRON MAIN INVENTORY



CAST IRON ATTRITION RATE

Avg 10-Yr Attrition Rate: 49.94 Miles/Year (2.82%)



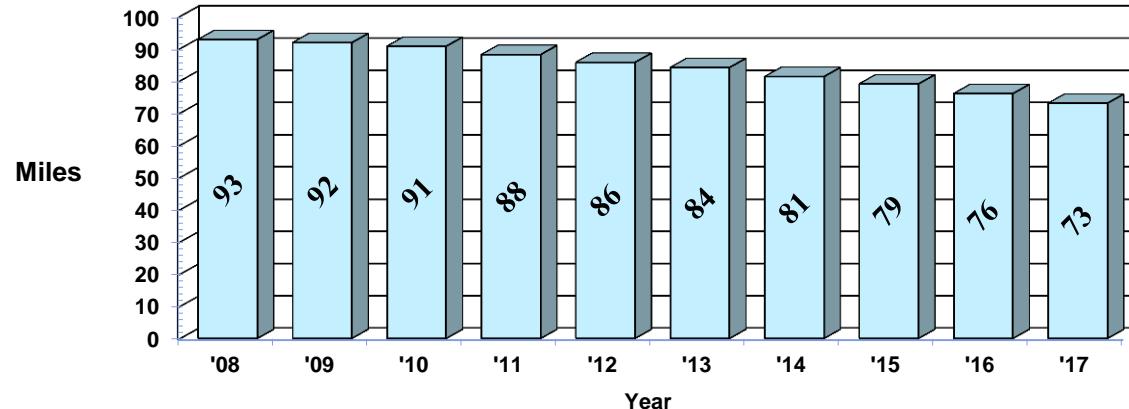
Cast Iron Inventory Includes Wrought Iron

2017 SYSTEM INTEGRITY REPORT

EGC

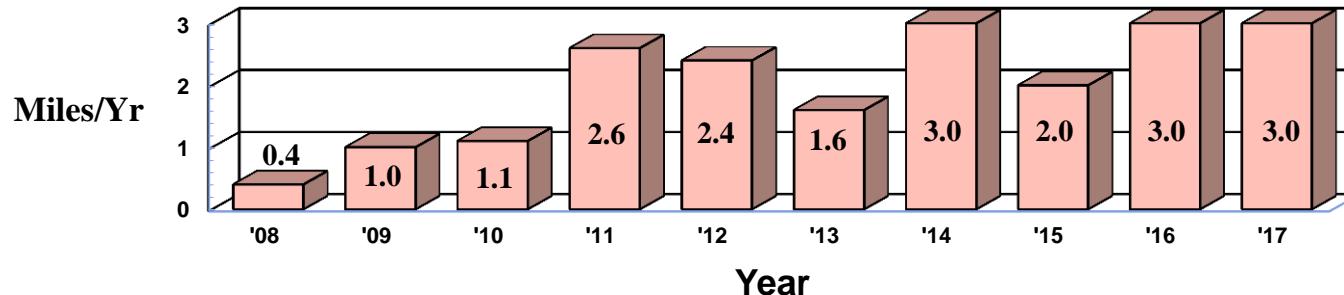
**DOT-
Reported
Pipe
Inventories**

CAST IRON MAIN INVENTORY



CAST IRON ATTRITION RATE

Avg 10-Yr Attrition Rate: 2.01 Miles/Year (2.75%)



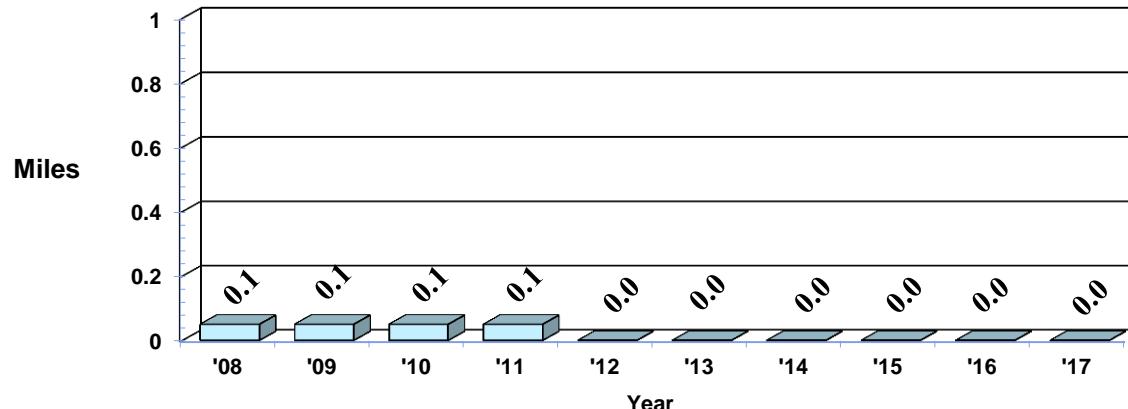
Cast Iron Inventory Includes Wrought Iron

2017 SYSTEM INTEGRITY REPORT

CAPE

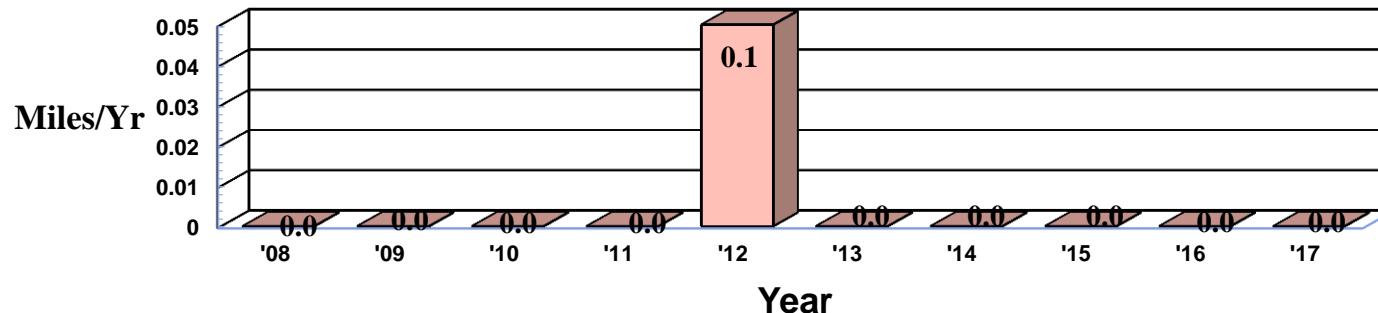
DOT-
Reported
Pipe
Inventories

CAST IRON MAIN INVENTORY



CAST IRON ATTRITION RATE

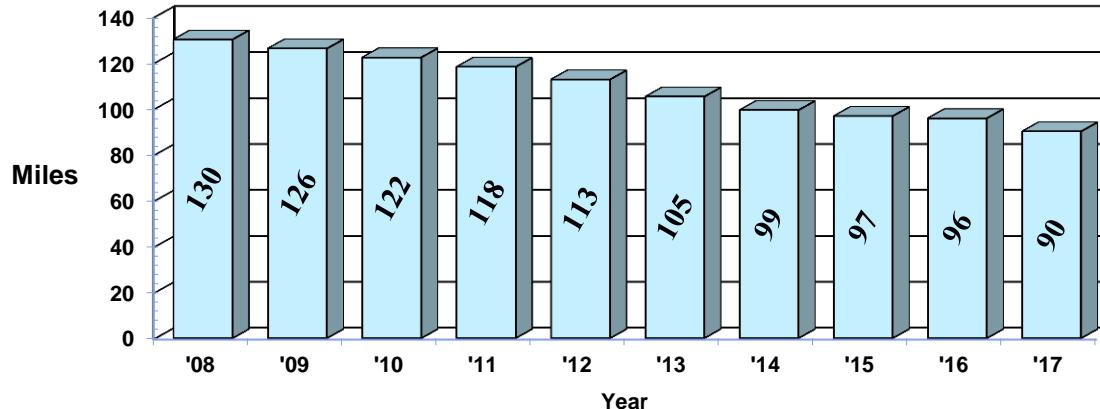
Avg 10-Yr Attrition Rate: 0.00 Miles/Year (0%)



2017 SYSTEM INTEGRITY REPORT

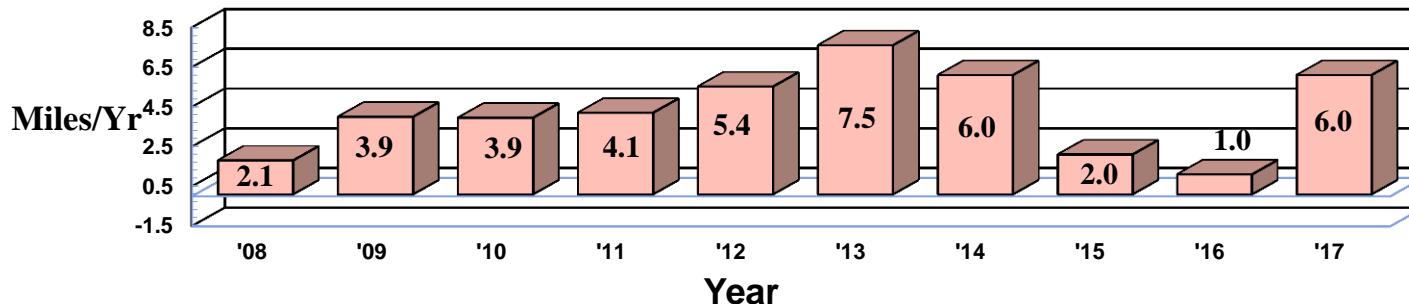
LOWELL CAST IRON MAIN INVENTORY

DOT-
Reported
Pipe
Inventories



CAST IRON ATTRITION RATE

Avg 10-Yr Attrition Rate: 4.15 Miles/Year (4.61%)

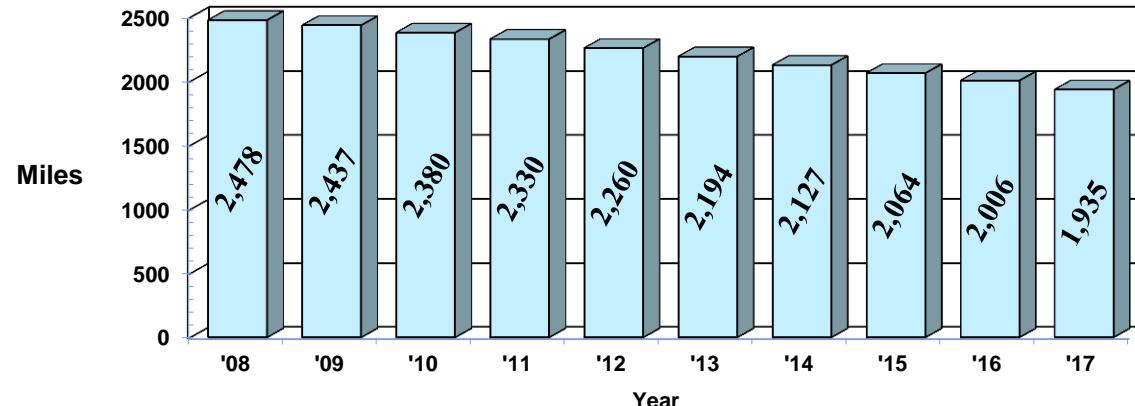


2017 SYSTEM INTEGRITY REPORT

MA

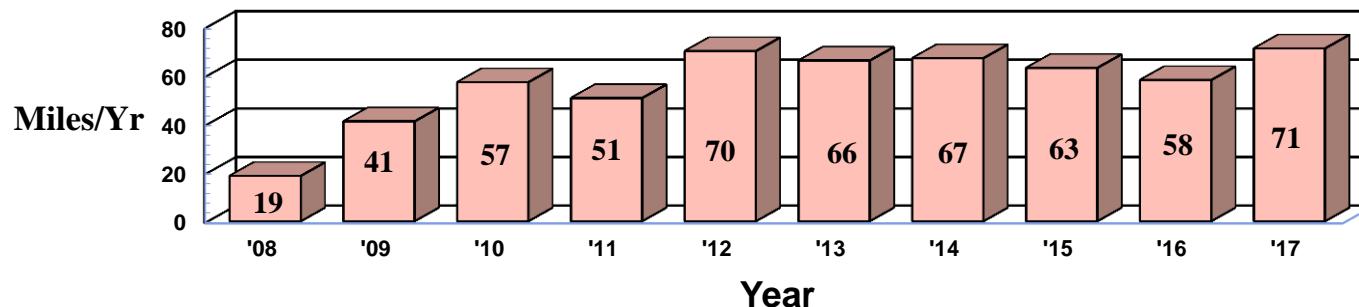
**DOT-
Reported
Pipe
Inventories**

CAST IRON MAIN INVENTORY



CAST IRON ATTRITION RATE

Avg 10-Yr Attrition Rate: 56.22 Miles/Year (2.91%)



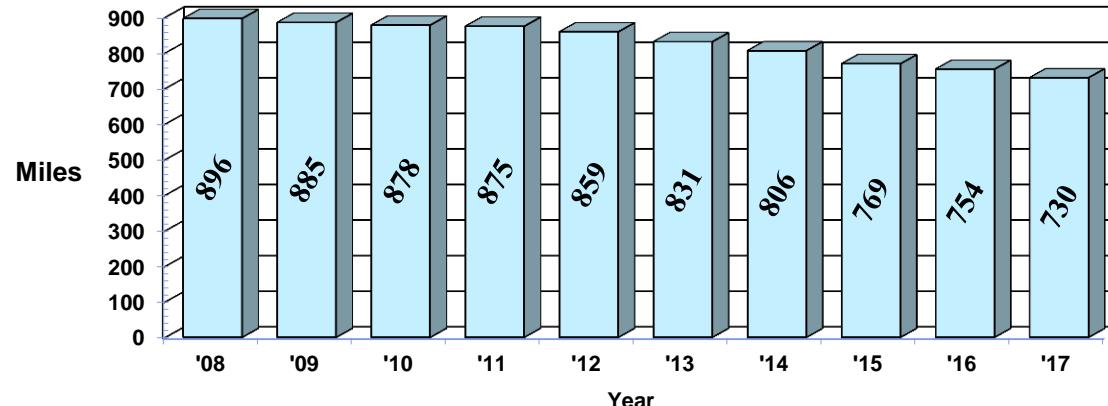
Cast Iron Inventory Includes Wrought Iron

2017 SYSTEM INTEGRITY REPORT

RI

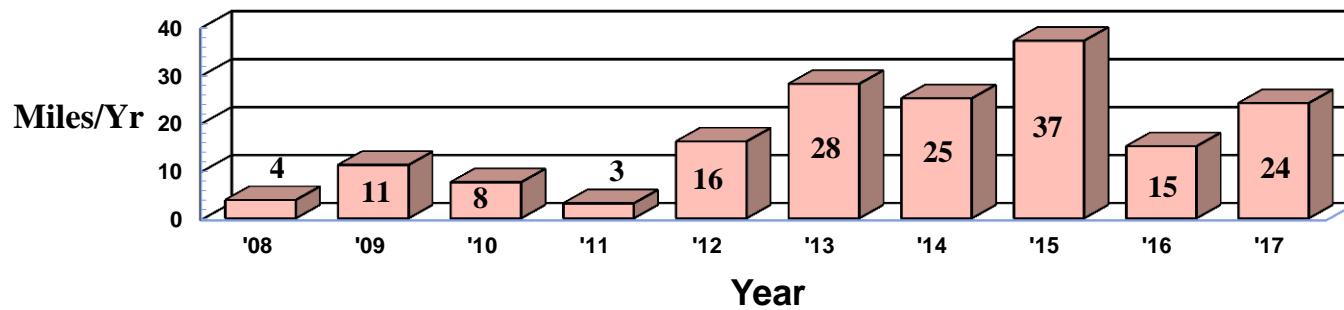
**DOT-
Reported
Pipe
Inventories**

CAST IRON MAIN INVENTORY



CAST IRON ATTRITION RATE

Avg 10-Yr Attrition Rate: 17.05 Miles/Year (2.34%)

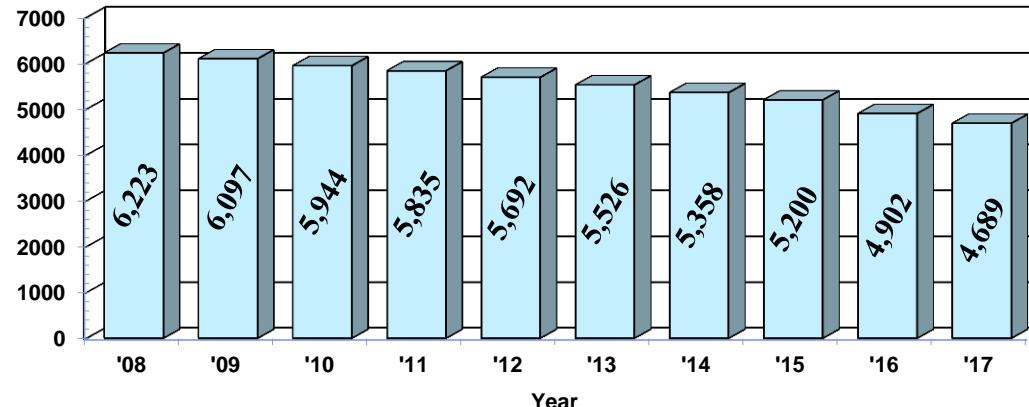


2017 SYSTEM INTEGRITY REPORT

US-NGrid CAST IRON MAIN INVENTORY

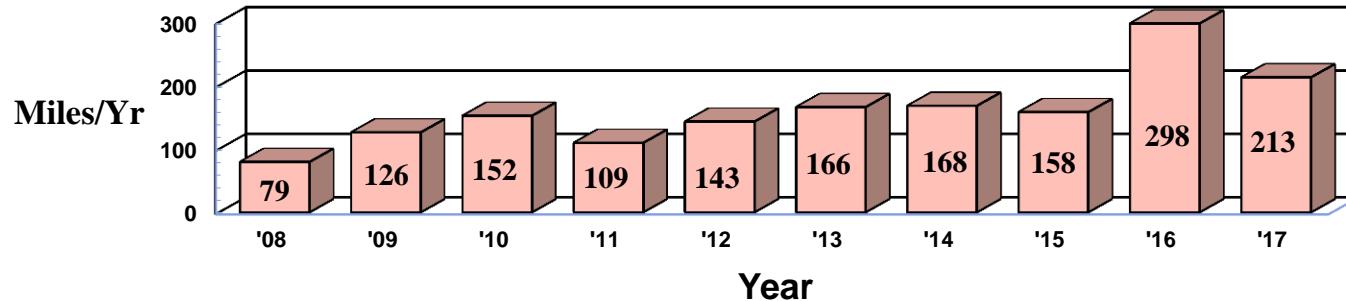
**DOT-
Reported
Pipe
Inventories**

Miles



CAST IRON ATTRITION RATE

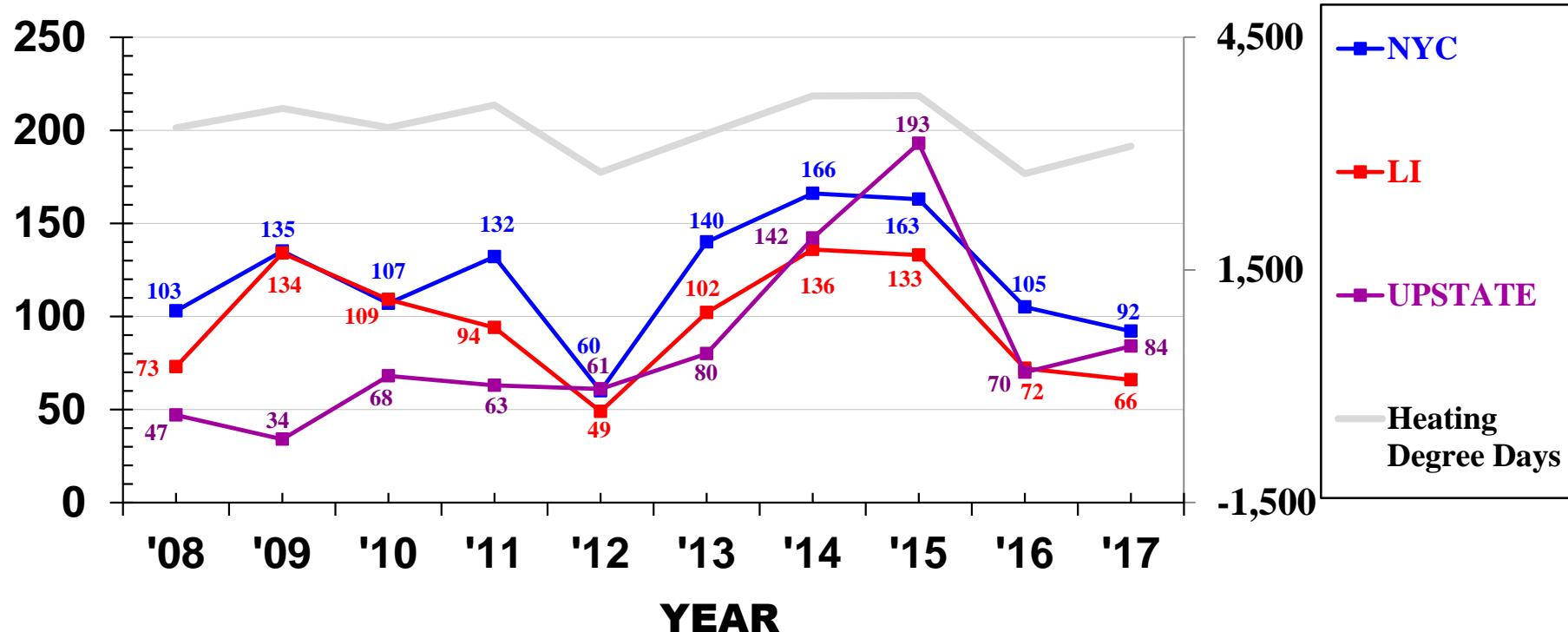
Avg 10-Yr Attrition Rate: 161.3 Miles/Year (3.44%)



2017 SYSTEM INTEGRITY REPORT

TOTAL CAST IRON MAIN BREAKS

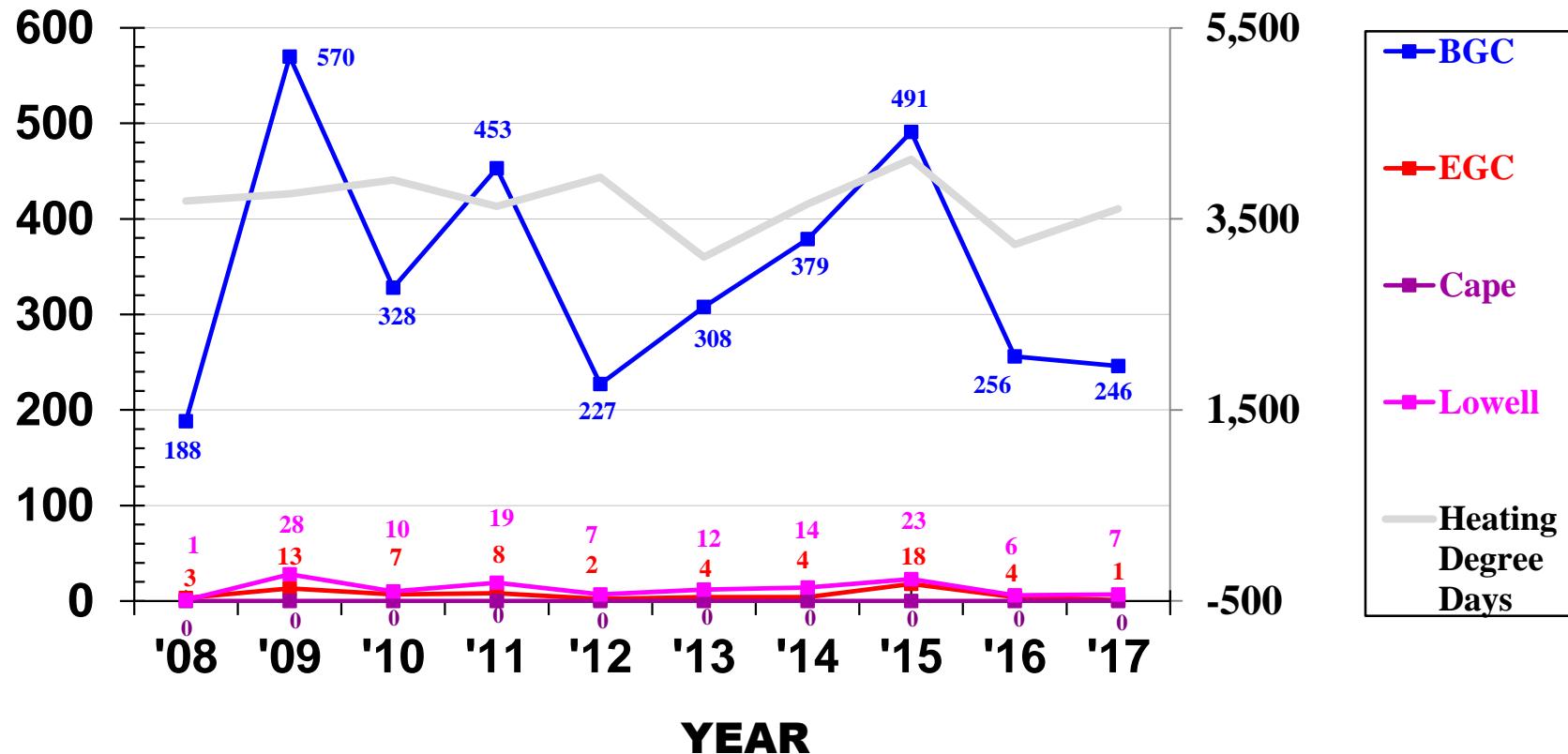
BREAKS



2017 SYSTEM INTEGRITY REPORT

BREAKS

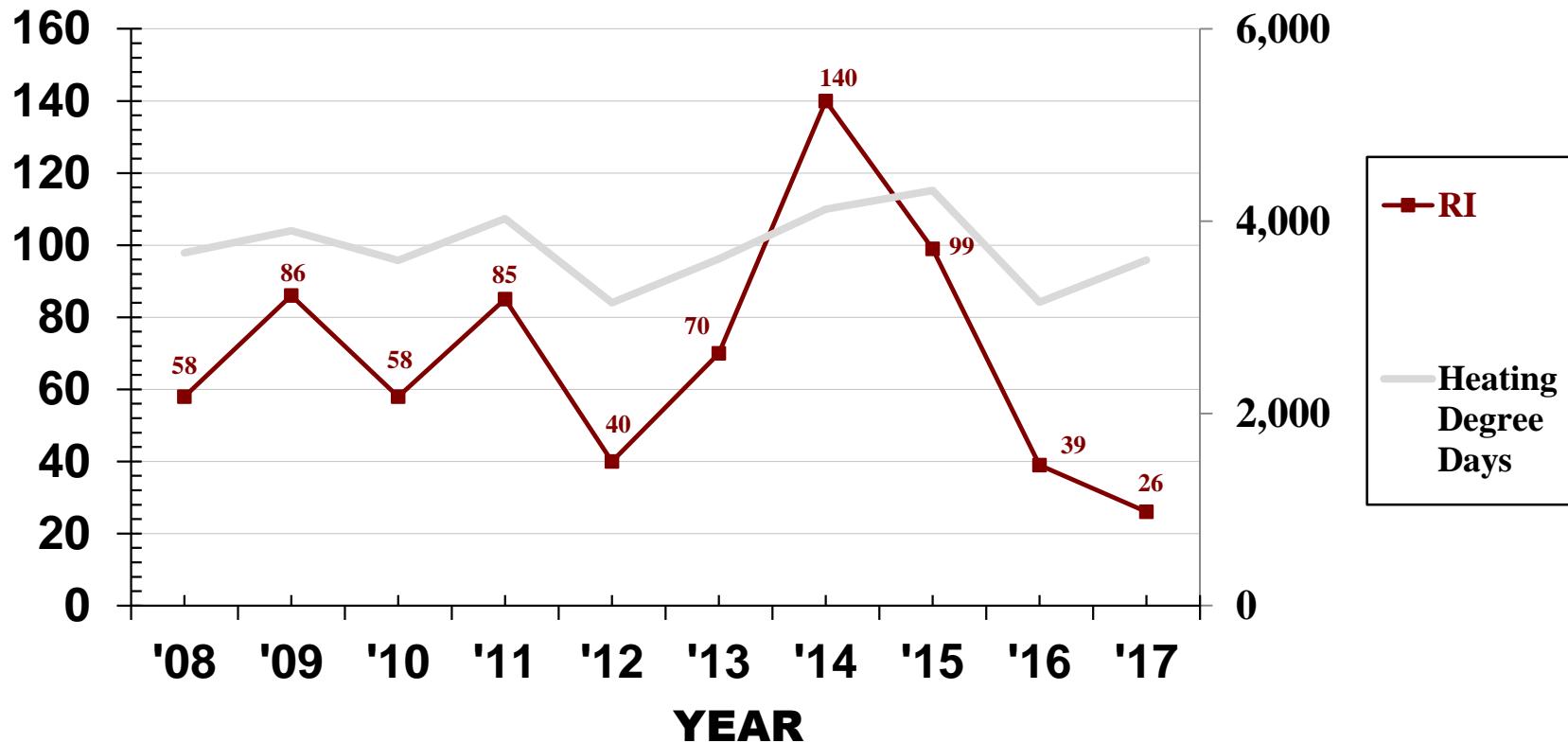
TOTAL CAST IRON MAIN BREAKS



2017 SYSTEM INTEGRITY REPORT

BREAKS

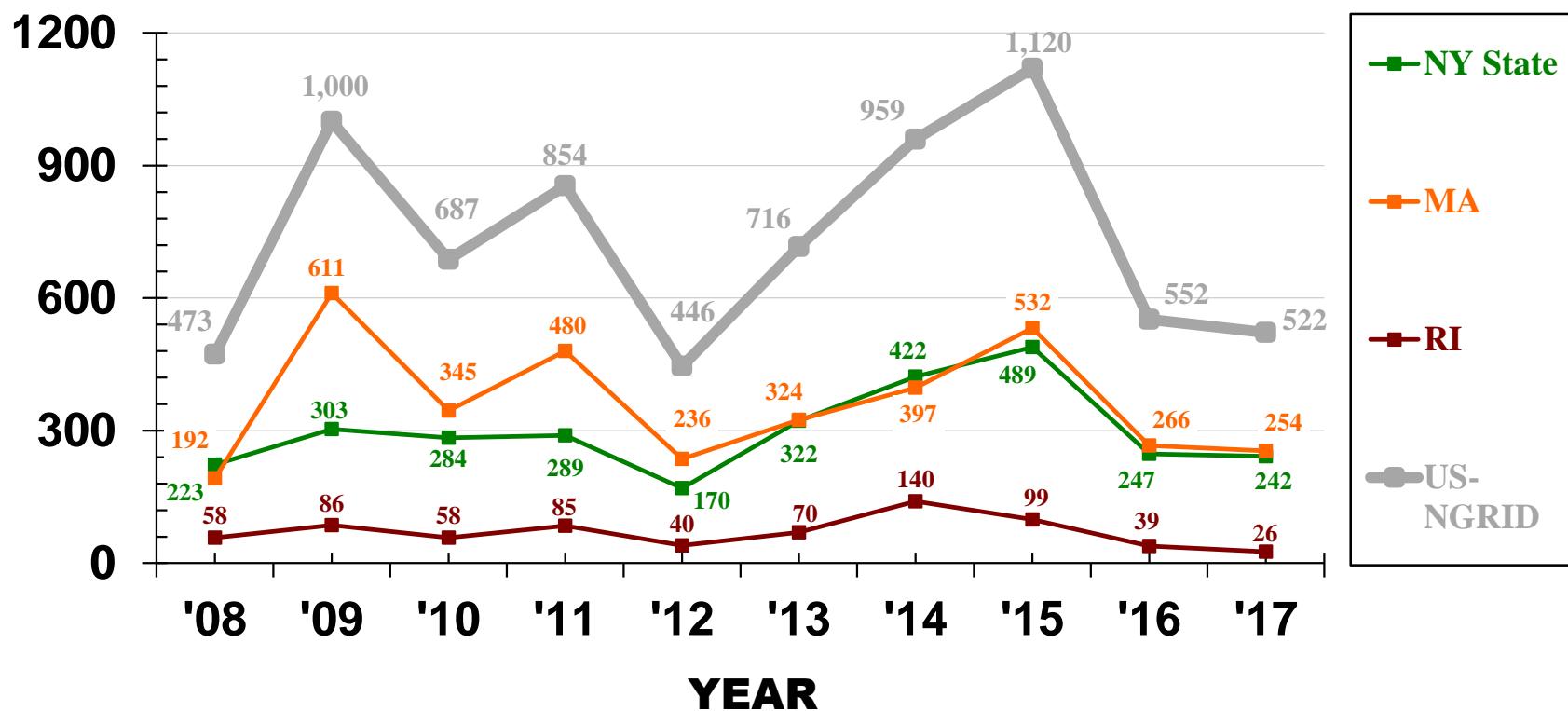
TOTAL CAST IRON MAIN BREAKS



2017 SYSTEM INTEGRITY REPORT

TOTAL CAST IRON MAIN BREAKS

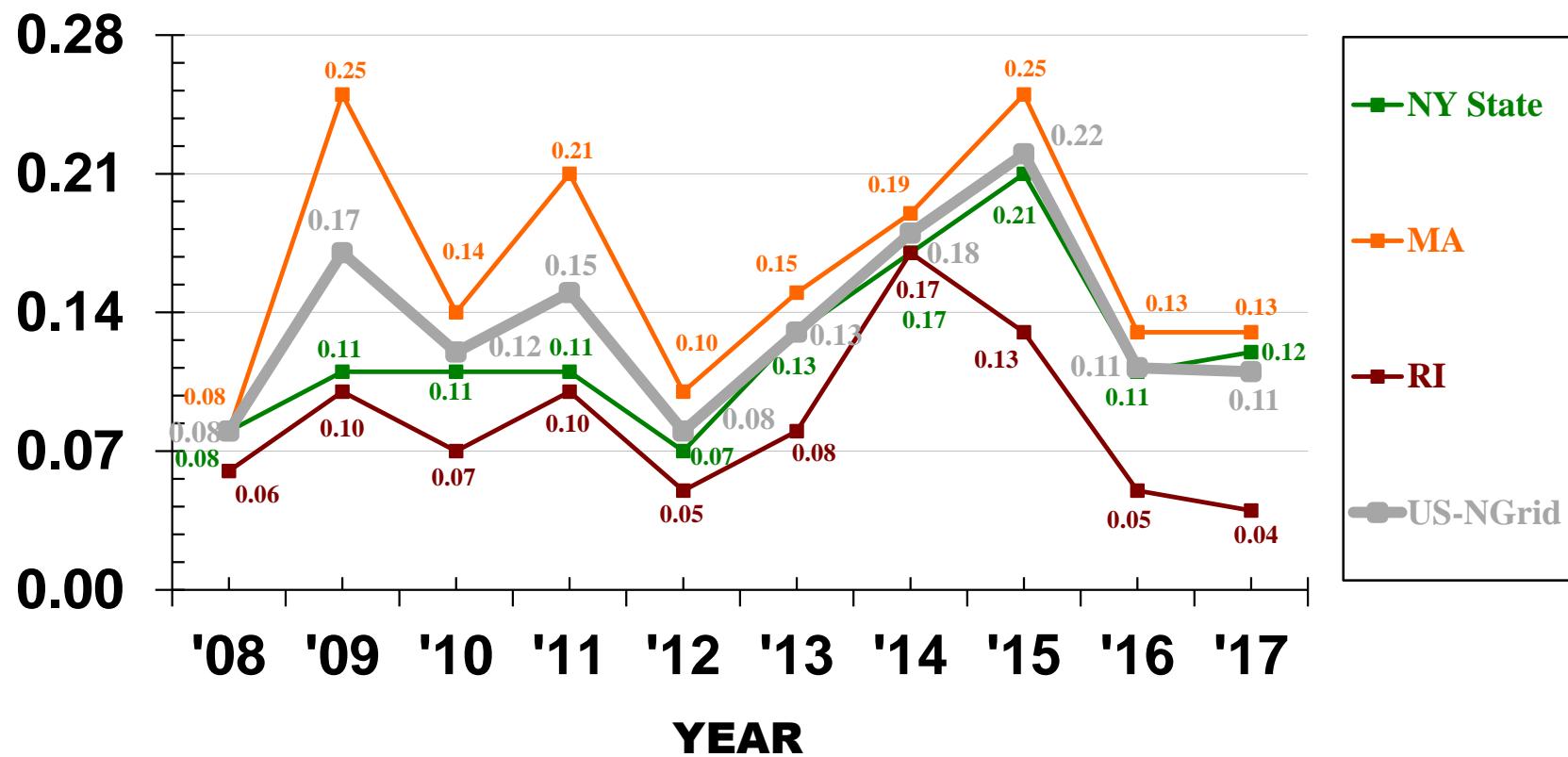
BREAKS



2017 SYSTEM INTEGRITY REPORT

**BREAKS
PER MILE**

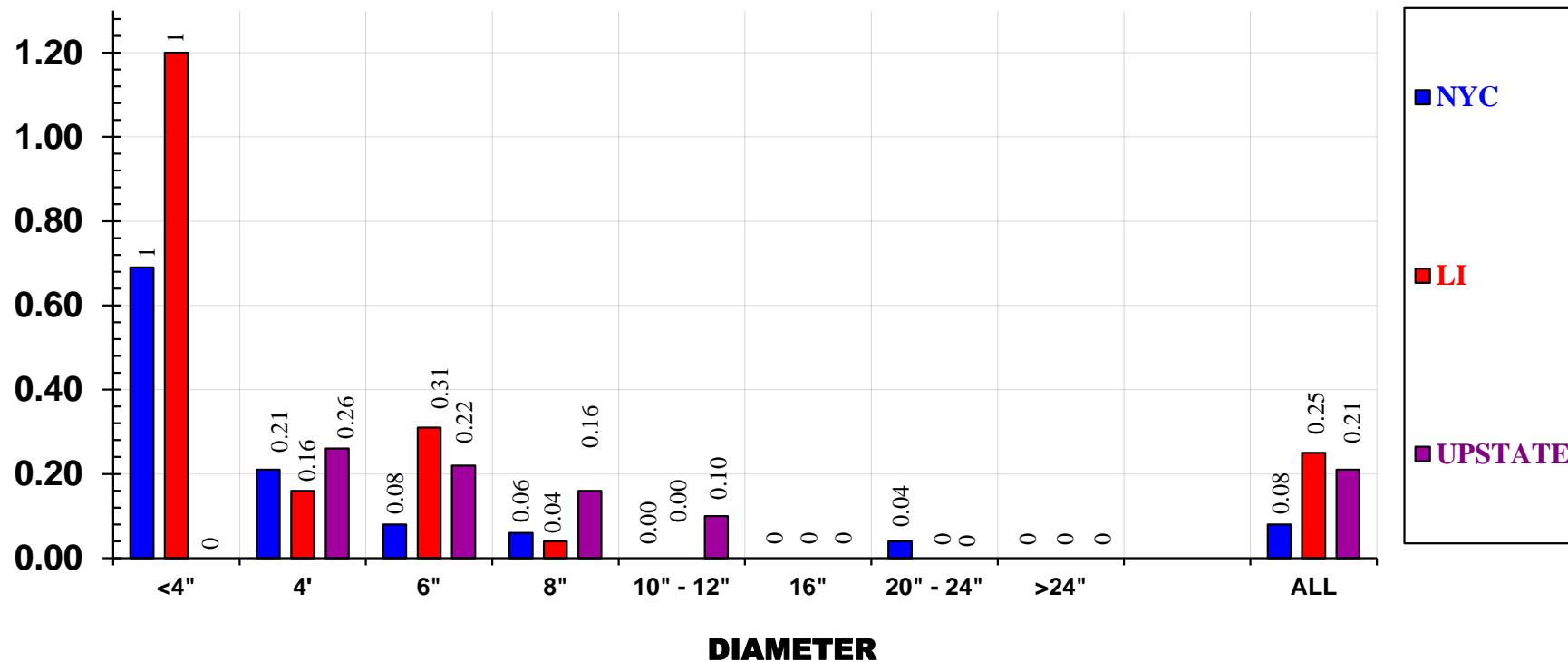
CAST IRON MAIN BREAK “RATES”



2017 SYSTEM INTEGRITY REPORT

CAST IRON MAIN BREAK “RATES” “NY REGION” COMPARISON BY DIAMETER

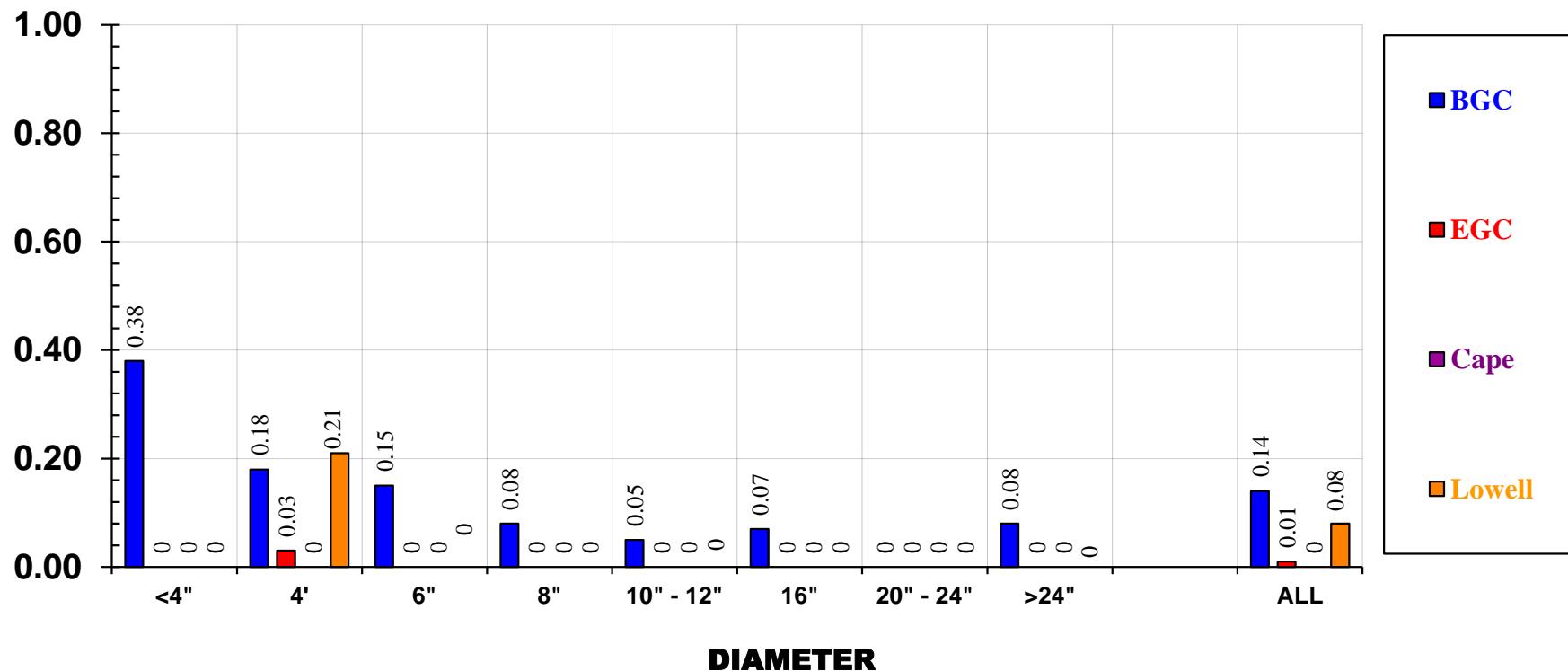
**CAST IRON BREAKS
PER MILE OF CI MAIN**



2017 SYSTEM INTEGRITY REPORT

CAST IRON MAIN BREAK “RATES” “MA REGION” COMPARISON BY DIAMETER

**CAST IRON BREAKS
PER MILE OF CI MAIN**



CI Inventory		
Size	2016	2017
< 4"	87	79
4"	669	641

CI Inventory		
Size	2016	2017
6"	750	719
8"	144	139

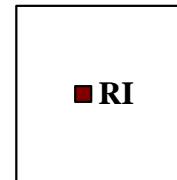
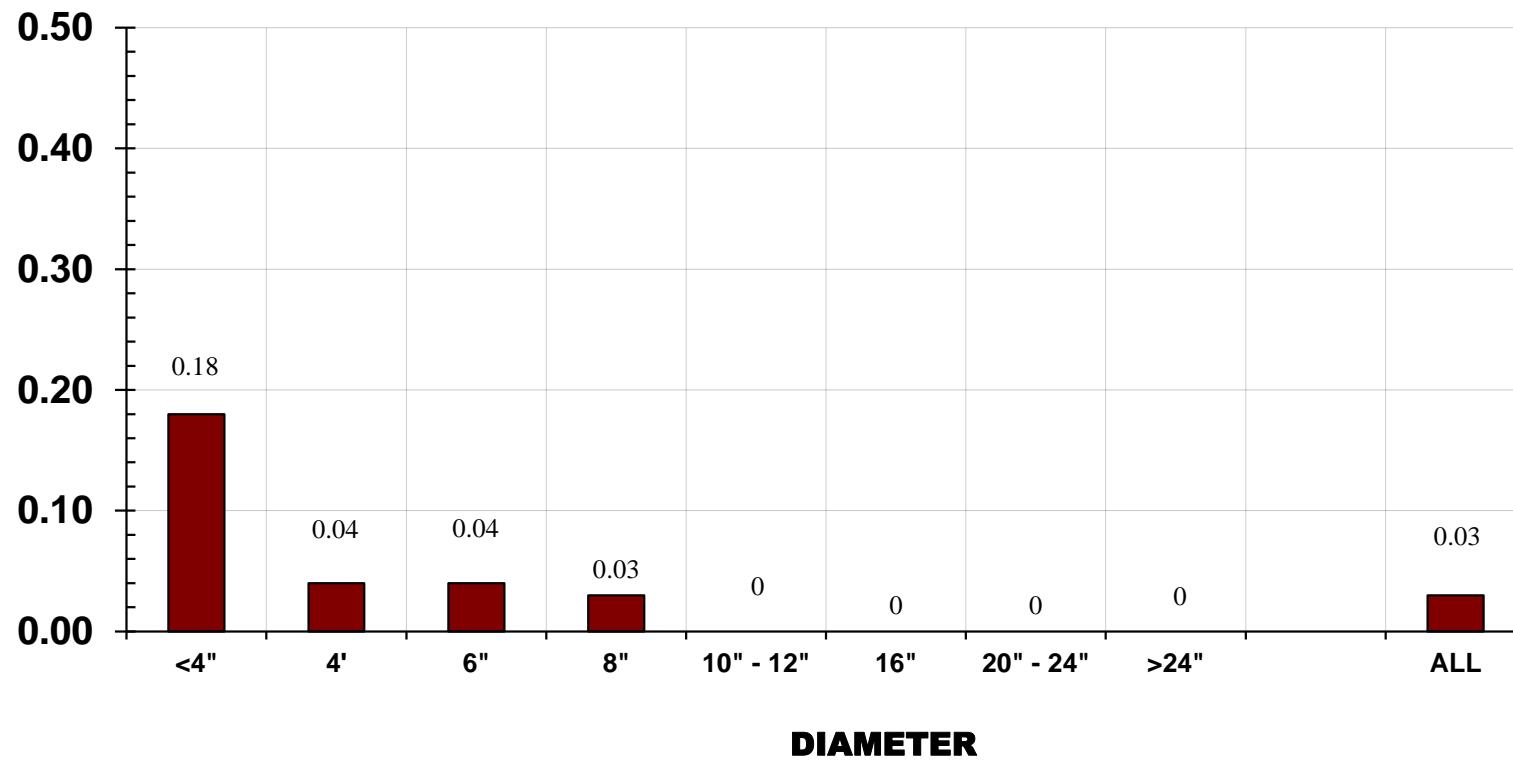
CI Inventory		
Size	2016	2017
10" - 12"	248	245
16"	33	33

CI Inventory		
Size	2016	2017
20" - 24"	56	56
24"	25	24

2017 SYSTEM INTEGRITY REPORT

CAST IRON MAIN BREAK “RATES” “RI REGION” COMPARISON BY DIAMETER

**CAST IRON BREAKS
PER MILE OF CI MAIN**



CI Inventory		
Size	2016	2017
< 4"	6	5
4"	302	281

CI Inventory		
Size	2016	2017
6"	319	303
8"	32	30

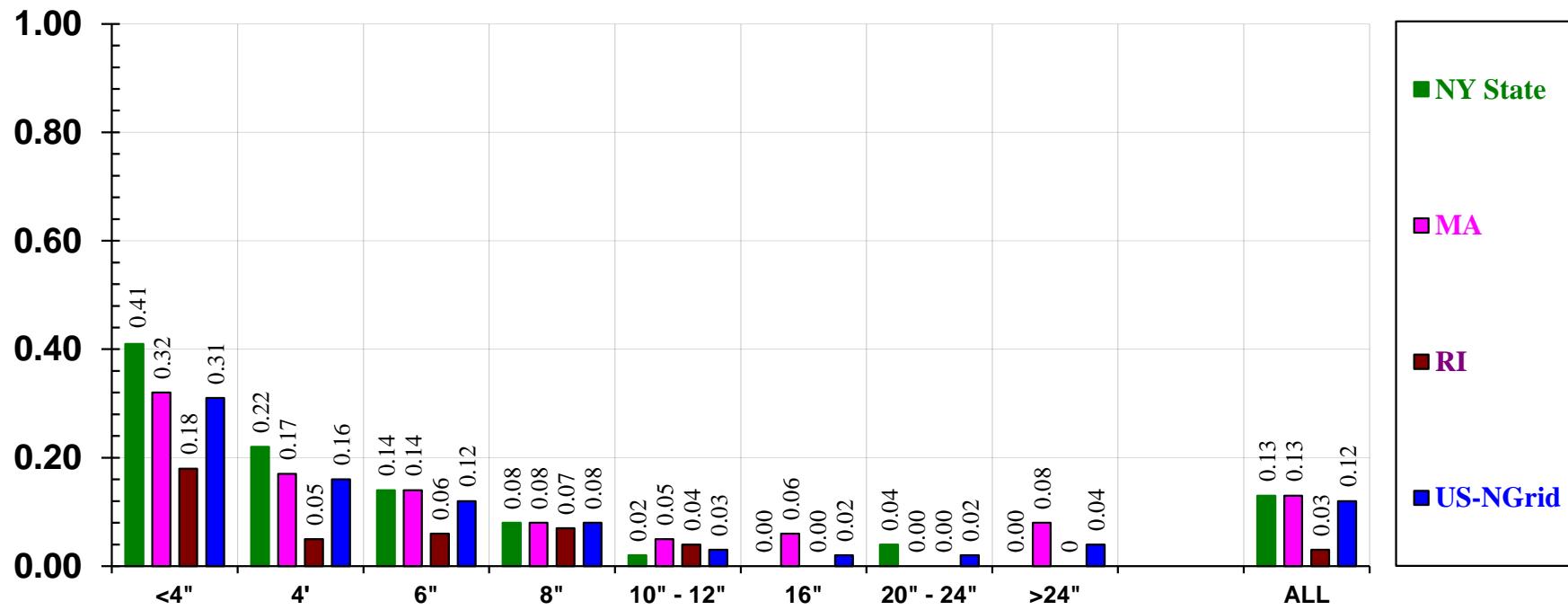
CI Inventory		
Size	2016	2017
10" - 12"	73	71
16"	18	17

CI Inventory		
Size	2016	2017
20" - 24"	14	13
24"	5	5

2017 SYSTEM INTEGRITY REPORT

CAST IRON MAIN BREAK “RATES” “ALL REGION” COMPARISON BY DIAMETER

**CAST IRON BREAKS
PER MILE OF CI MAIN**



DIAMETER

CI Inventory		
Size	2016	2017
< 4"	99	90
4"	1,366	1,288

CI Inventory		
Size	2016	2017
6"	2,202	2,098
8"	377	363

CI Inventory		
Size	2016	2017
10" - 12"	587	577
16"	96	98

CI Inventory		
Size	2016	2017
20" - 24"	122	119
24"	53	53

2017 SYSTEM INTEGRITY REPORT

A CLOSER LOOK AT STEEL MAINS

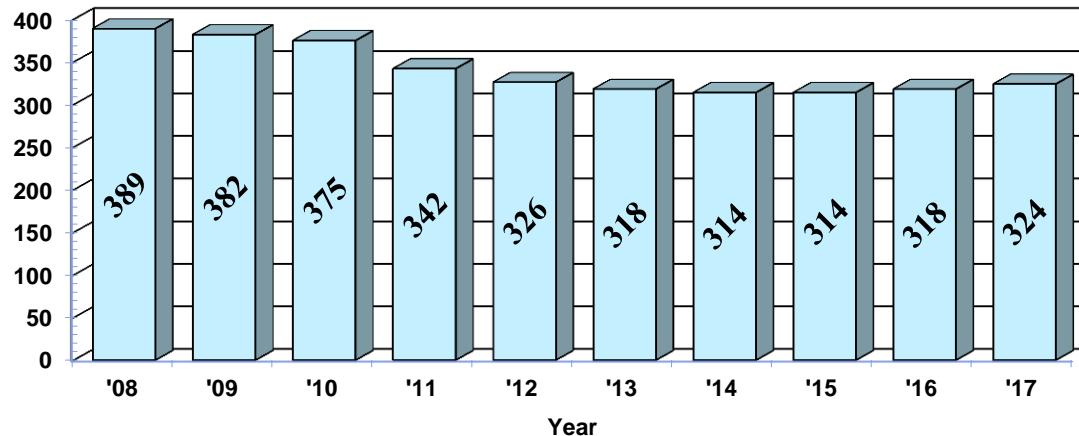


2017 SYSTEM INTEGRITY REPORT

NYC

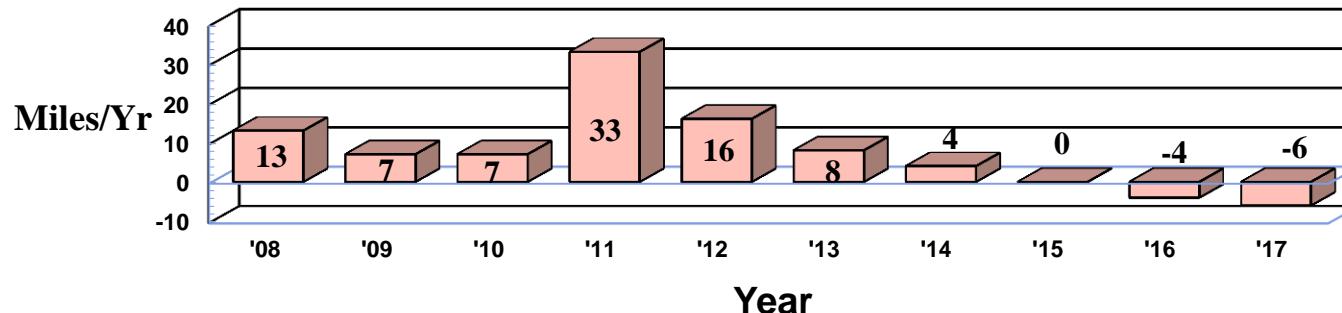
DOT-
Reported
Pipe
Inventories
Miles

UNPROTECTED STEEL MAIN INVENTORY



BARE/UNPROTECTED STEEL ATTRITION RATE

Avg 10-Yr Attrition Rate: 7.80 Miles/Year (2.41%)



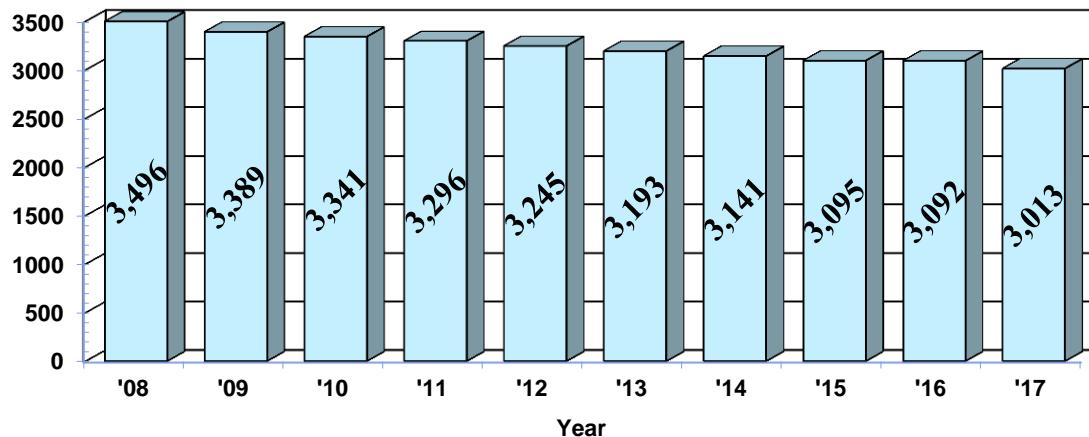
NOTE: 2016 Inventory increased due to GIS (NRG) data correction

2017 SYSTEM INTEGRITY REPORT



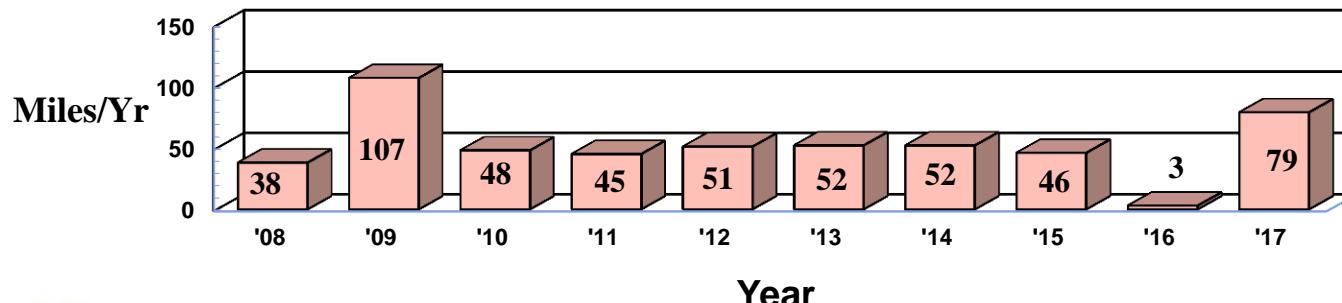
UNPROTECTED STEEL MAIN INVENTORY

DOT-
Reported
Pipe
Inventories
Miles



UNPROTECTED STEEL ATTRITION RATE

Avg 10-Yr Attrition Rate: 52.10 Miles/Year (1.73%)

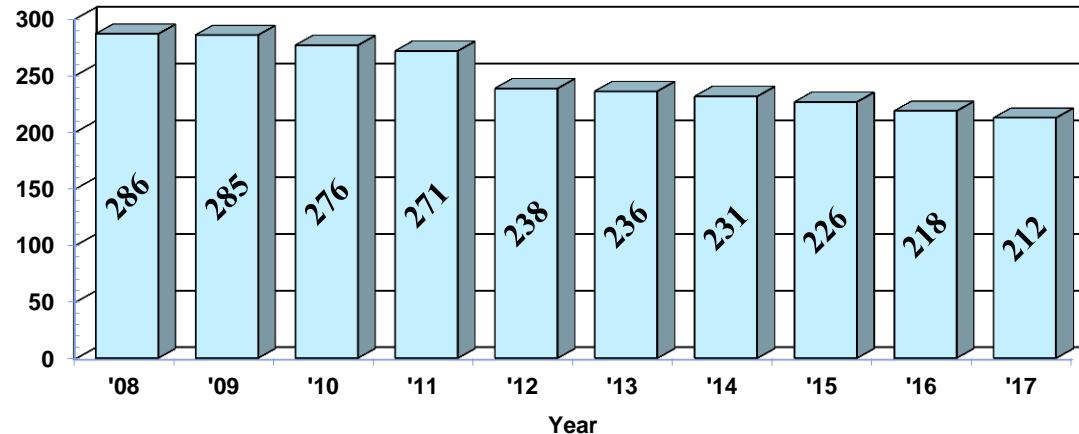


2017 SYSTEM INTEGRITY REPORT

UPSTATE

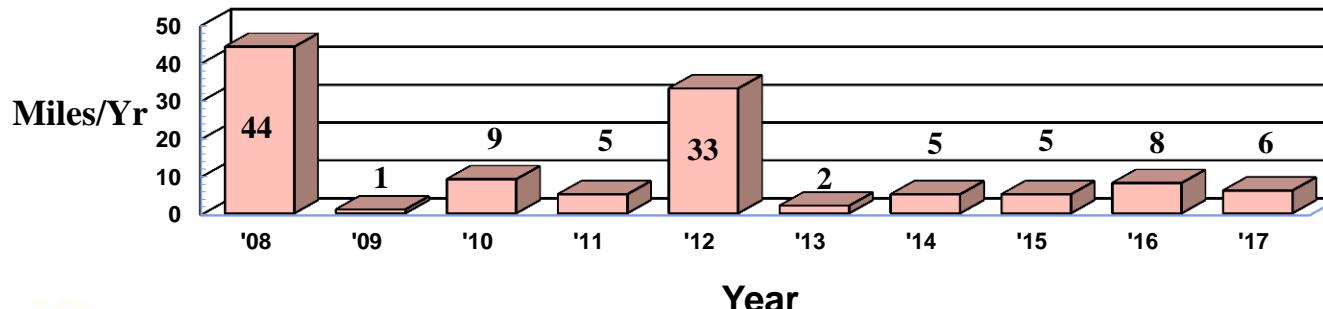
UNPROTECTED STEEL MAIN INVENTORY

DOT-
Reported
Pipe
Inventories
Miles



UNPROTECTED STEEL ATTRITION RATE

Avg 10-Yr Attrition Rate: 11.80 Miles/Year (5.57%)

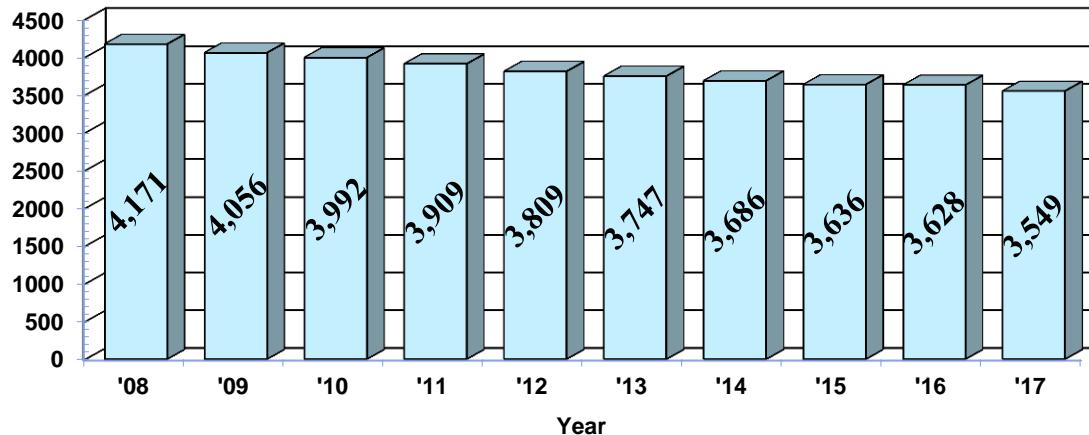


2017 SYSTEM INTEGRITY REPORT

NY State

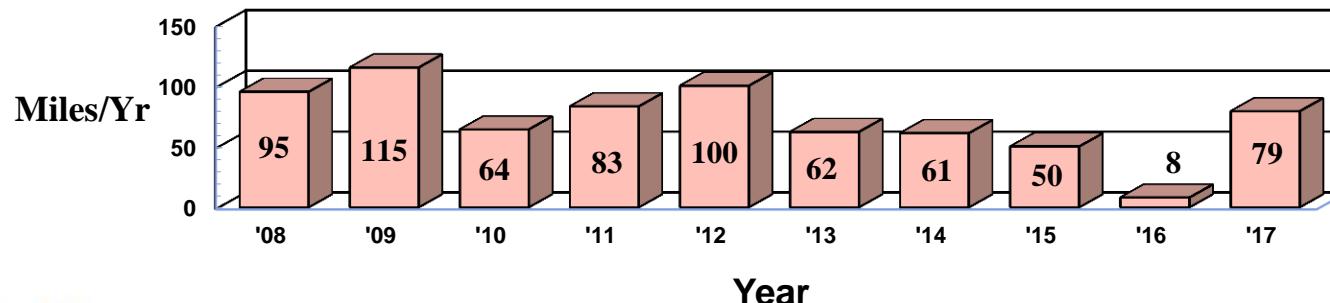
UNPROTECTED STEEL MAIN INVENTORY

DOT-
Reported
Pipe
Inventories
Miles



UNPROTECTED STEEL ATTRITION RATE

Avg 10-Yr Attrition Rate: 71.70 Miles/Year (2.02%)



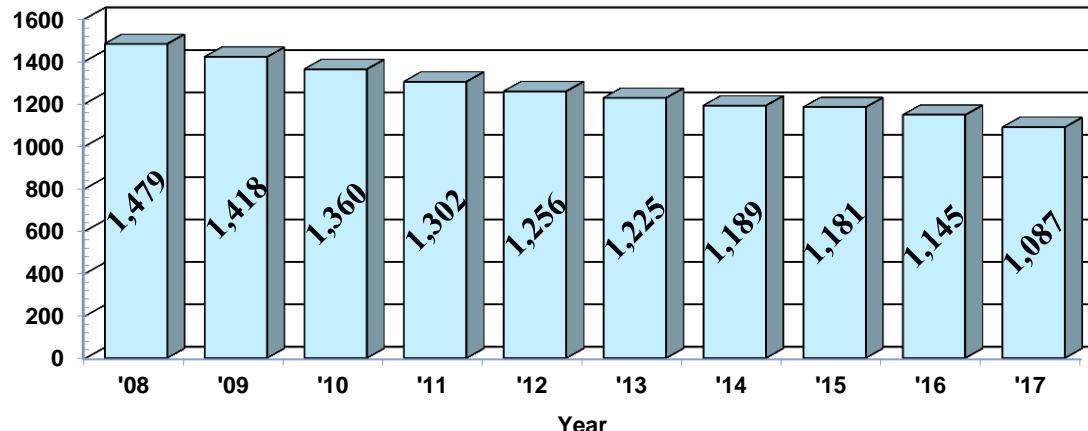
NOTE: NYC and LI 2016 Inventory increased due to GIS (NRG) data correction

2017 SYSTEM INTEGRITY REPORT

BGC

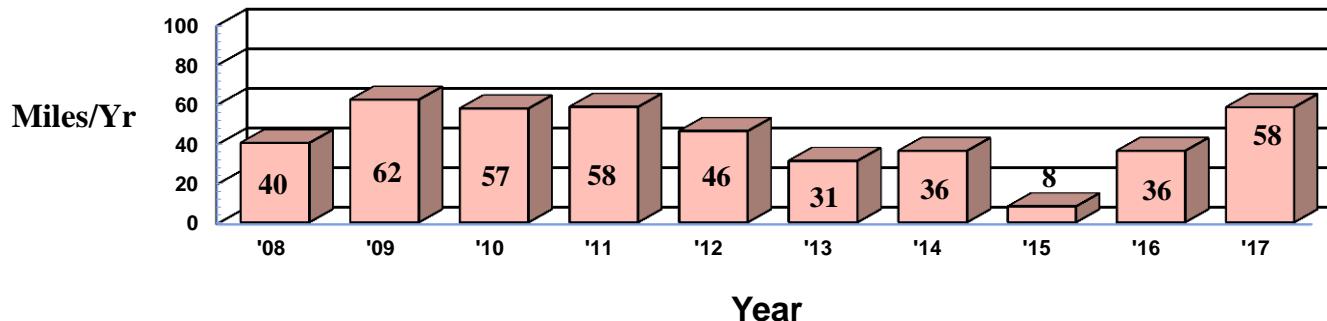
DOT-
Reported
Pipe
Inventories
Miles

UNPROTECTED STEEL MAIN INVENTORY



UNPROTECTED STEEL ATTRITION RATE

Avg 10 -Yr Attrition Rate: 43.24 Miles/Year (3.98%)



nationalgrid

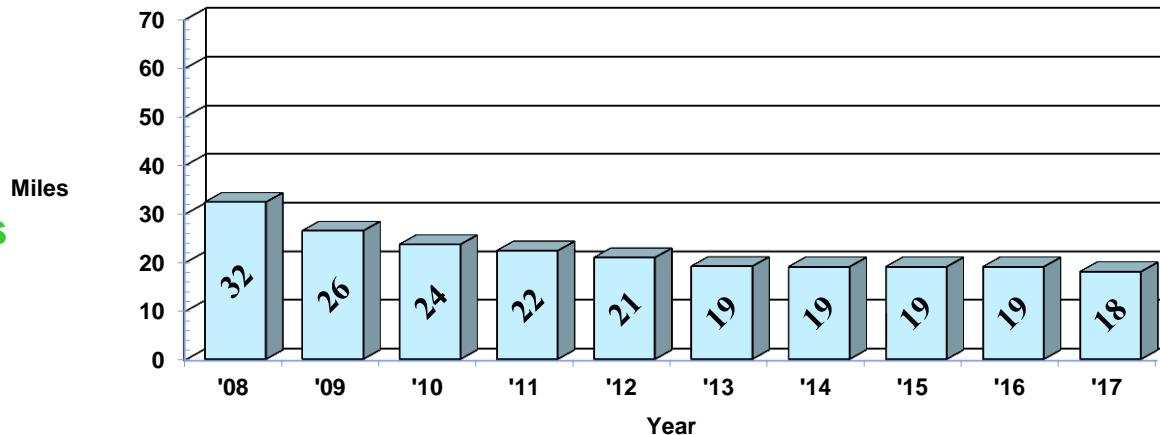
NOTE: In NE(BGC), Attrition is due to both replacement and “added” cathodic protection.

2017 SYSTEM INTEGRITY REPORT

EGC

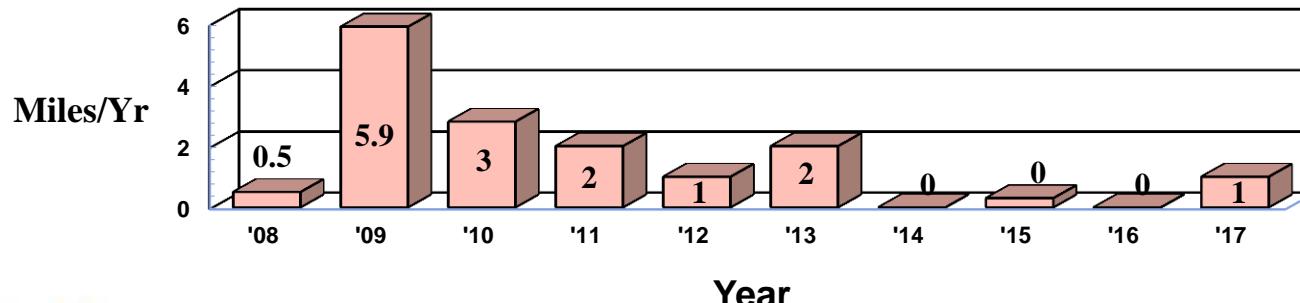
DOT-
Reported
Pipe
Inventories

UNPROTECTED STEEL MAIN INVENTORY



UNPROTECTED STEEL ATTRITION RATE

Avg 10 -Yr Attrition Rate: 1.55 Miles/Year (8.61%)



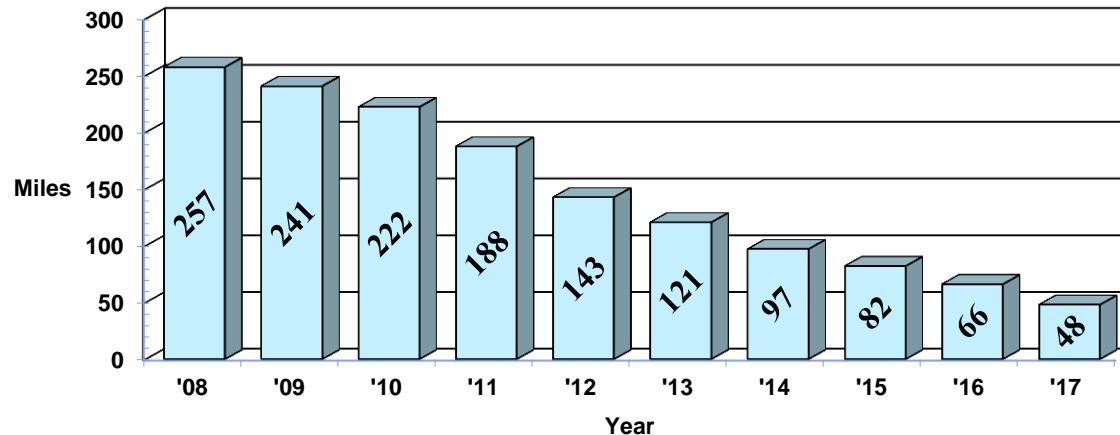
NOTE: In NE(EGC), Attrition is due to both replacement and “added” cathodic protection.

2017 SYSTEM INTEGRITY REPORT

CAPE

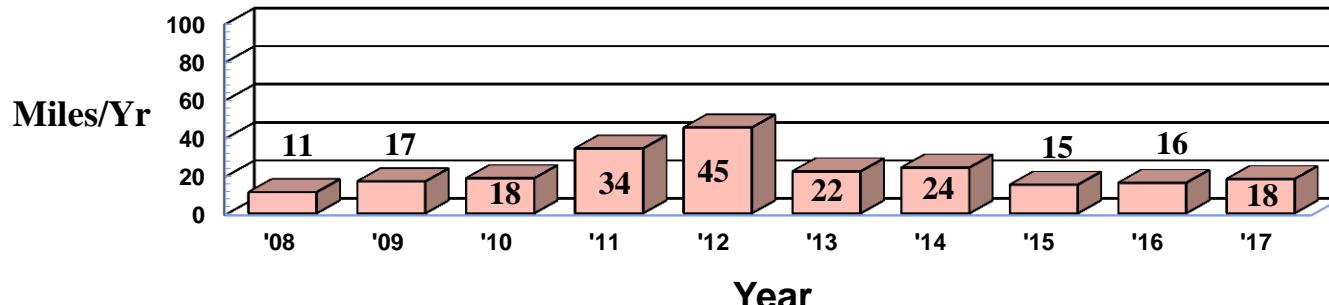
DOT-
Reported
Pipe
Inventories

UNPROTECTED STEEL MAIN INVENTORY



UNPROTECTED STEEL ATTRITION RATE

Avg 10 -Yr Attrition Rate: 22.02 Miles/Year (45.88%)



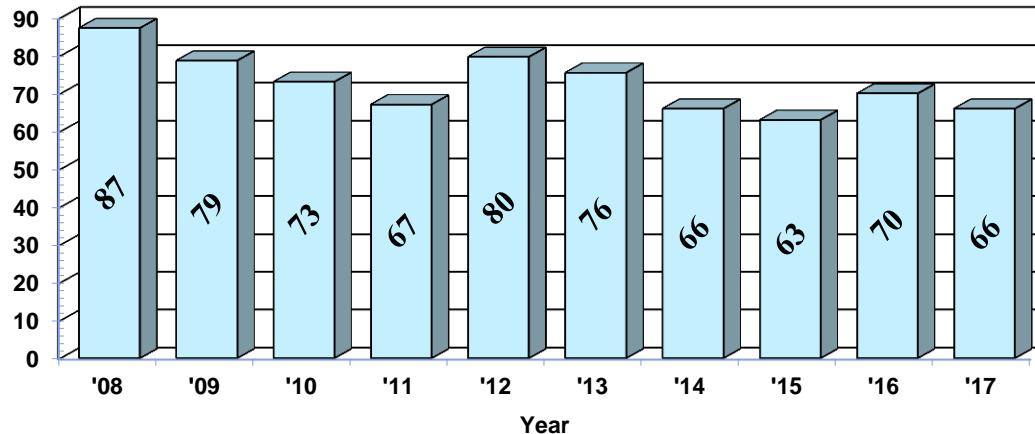
2017 SYSTEM INTEGRITY REPORT

LOWELL

UNPROTECTED STEEL MAIN INVENTORY

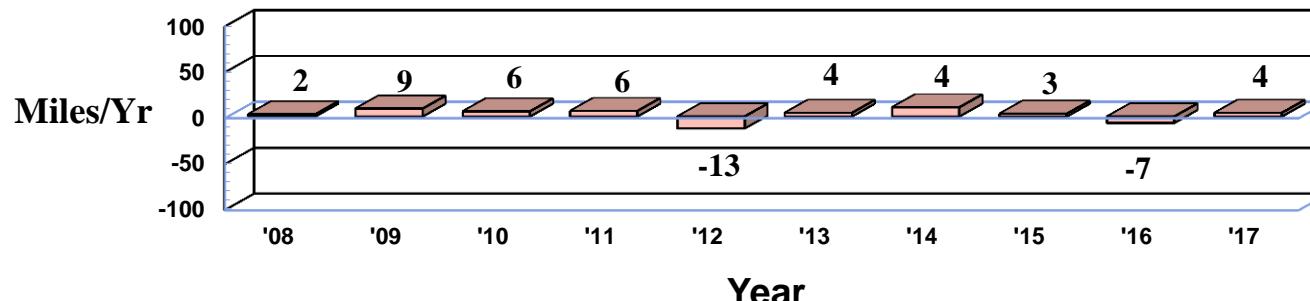
DOT-
Reported
Pipe
Inventories

Miles



UNPROTECTED STEEL ATTRITION RATE

Avg 10 -Yr Attrition Rate: 2.36 Miles/Year (3.57%)



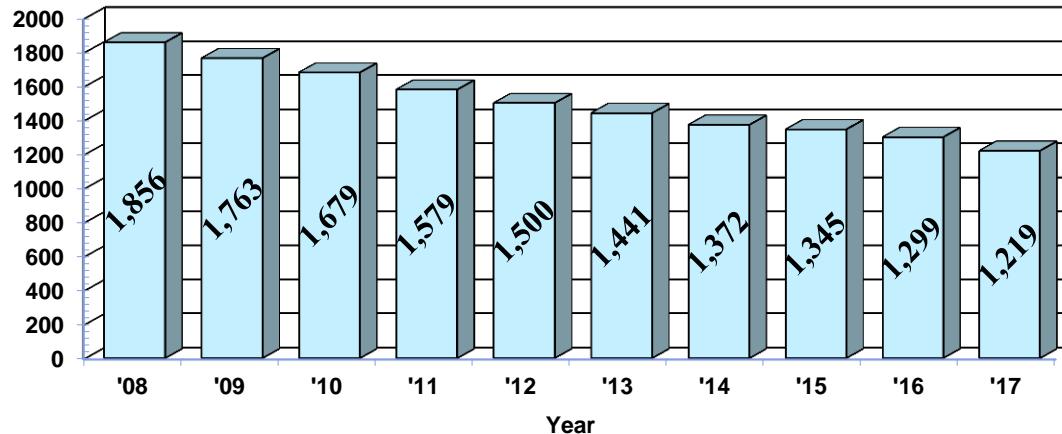
2017 SYSTEM INTEGRITY REPORT

MA

DOT-
Reported
Pipe
Inventories

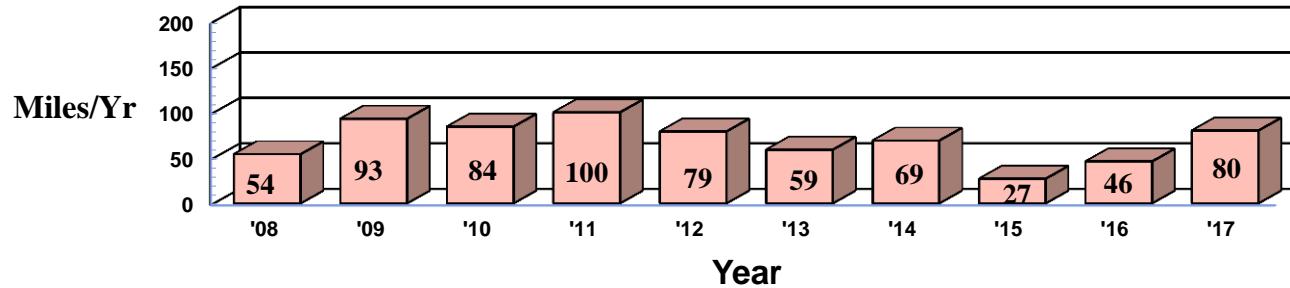
Miles

UNPROTECTED STEEL MAIN INVENTORY



UNPROTECTED STEEL ATTRITION RATE

Avg 10-Yr Attrition Rate: 69.13 Miles/Year (5.67%)

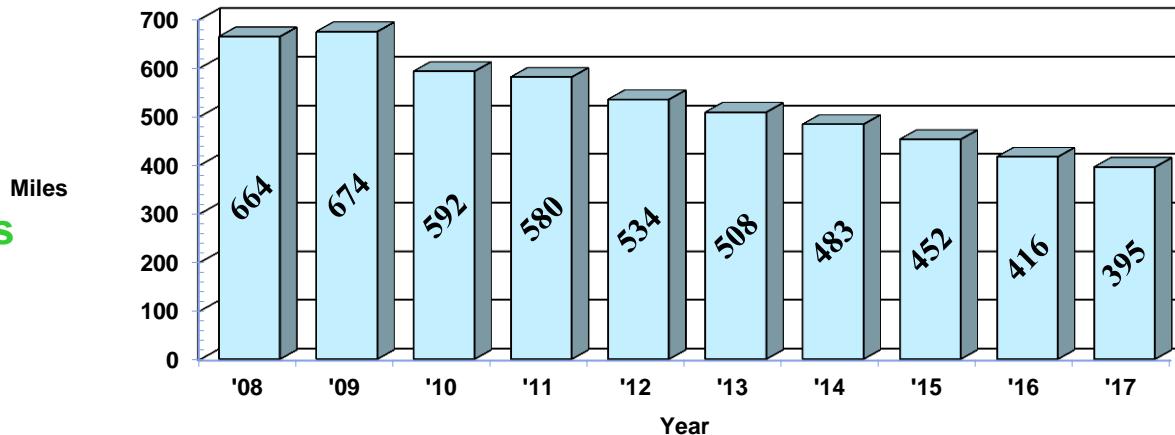


2017 SYSTEM INTEGRITY REPORT

RI

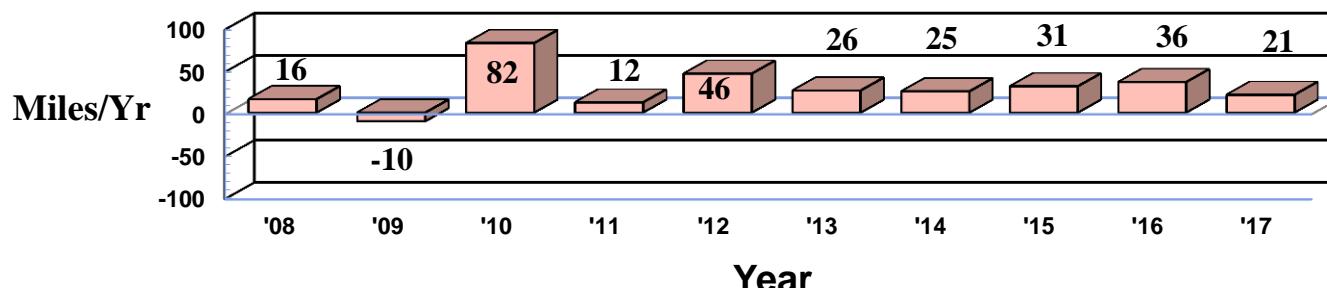
UNPROTECTED STEEL MAIN INVENTORY

DOT-
Reported
Pipe
Inventories



UNPROTECTED STEEL ATTRITION RATE

Avg 10 -Yr Attrition Rate: 28.43 Miles/Year (7.20%)



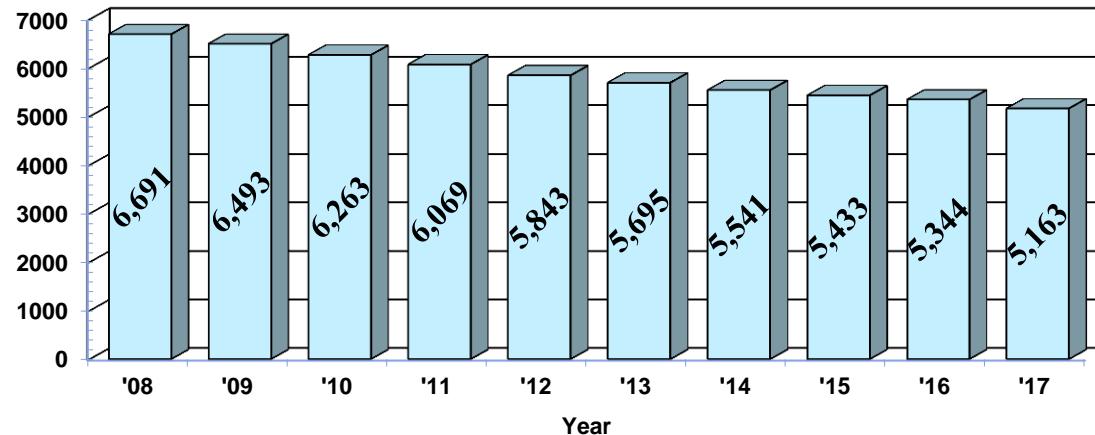
NOTE: In RI, Attrition is due to both replacement and “added” cathodic protection.

2017 SYSTEM INTEGRITY REPORT

US-NGrid

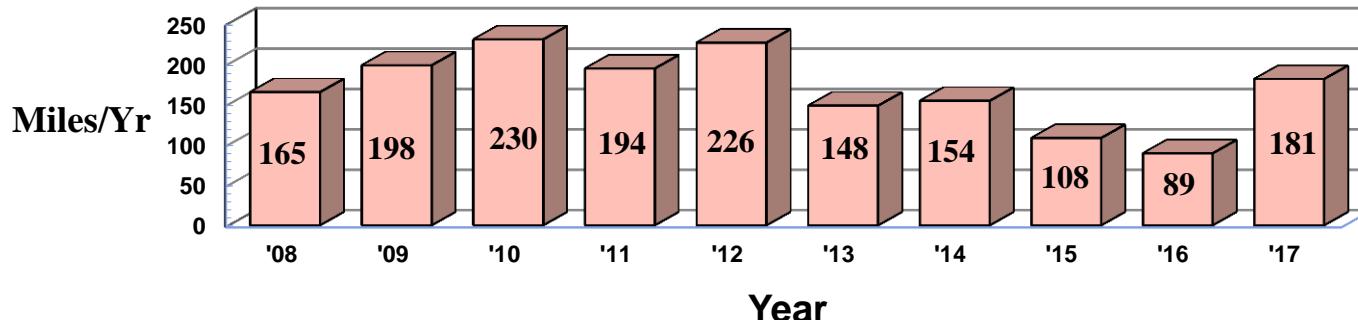
UNPROTECTED STEEL MAIN INVENTORY

DOT-
Reported
Pipe
Inventories
Miles



UNPROTECTED STEEL ATTRITION RATE

Avg 10 -Yr Attrition Rate: 169.26 Miles/Year (3.28%)

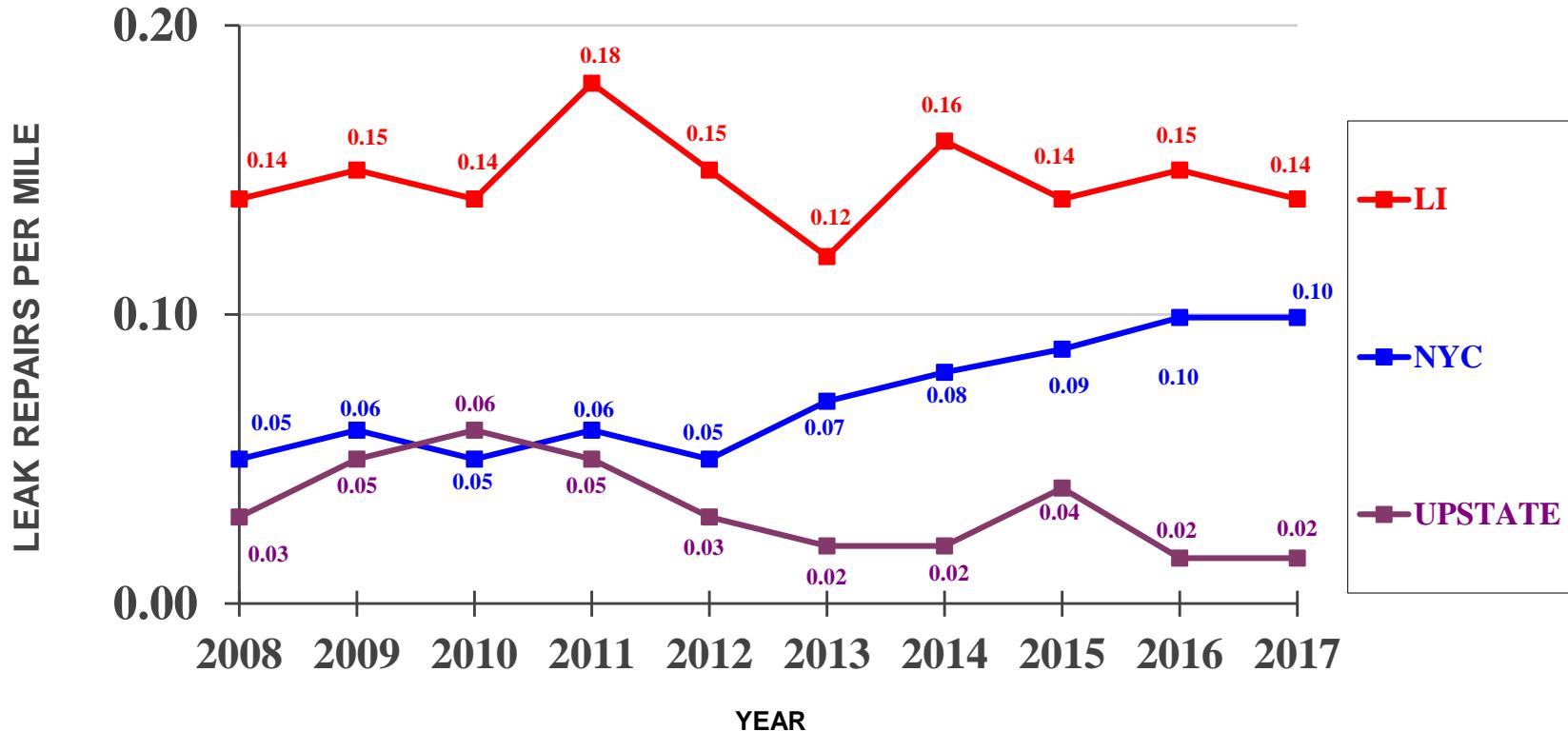


NOTE:

- NYC and LI 2016 Inventory increased due to GIS (NRG) data correction

2017 SYSTEM INTEGRITY REPORT

MAIN CORROSION LEAK “RATES” CORROSION Leak Repairs Per Mile of “TOTAL” Steel

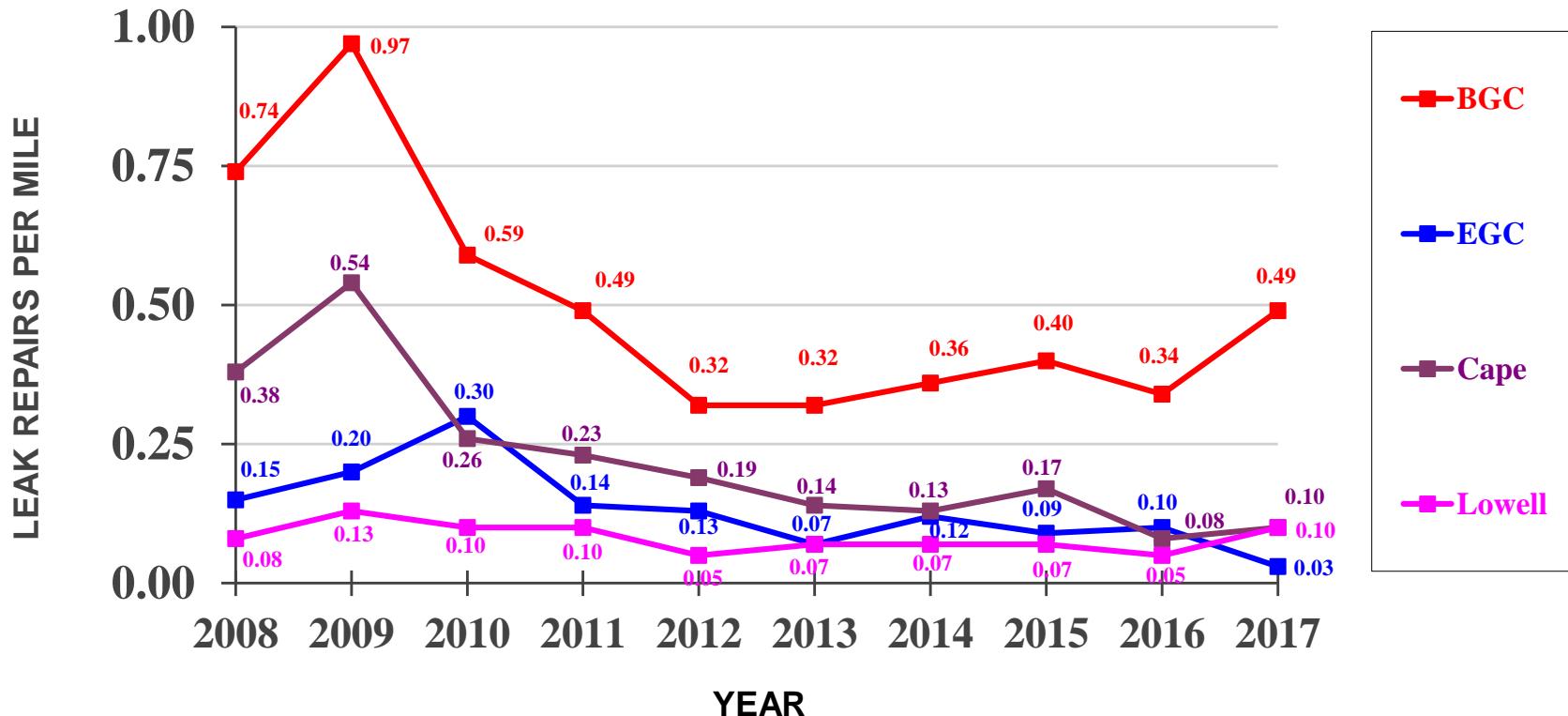


2017 SYSTEM INTEGRITY REPORT

MAIN CORROSION LEAK “RATES”

CORROSION Leak Repairs Per Mile of “TOTAL” Steel

INCLUDES ALL CORROSION LEAKS, REGARDLESS OF MAIN MATERIAL

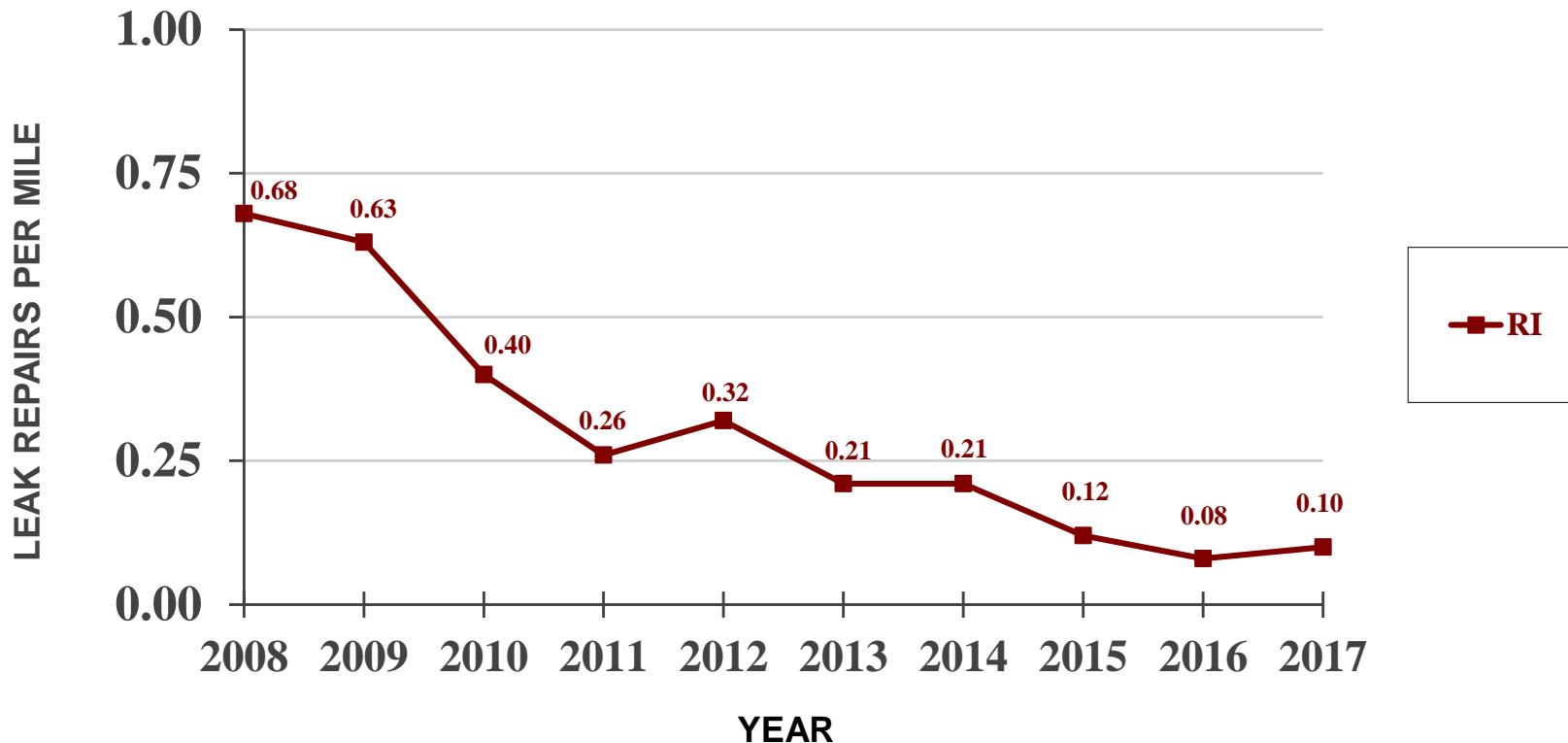


2017 SYSTEM INTEGRITY REPORT

MAIN CORROSION LEAK “RATES”

CORROSION Leak Repairs Per Mile of “TOTAL” Steel

INCLUDES ALL CORROSION LEAKS, REGARDLESS OF MAIN MATERIAL

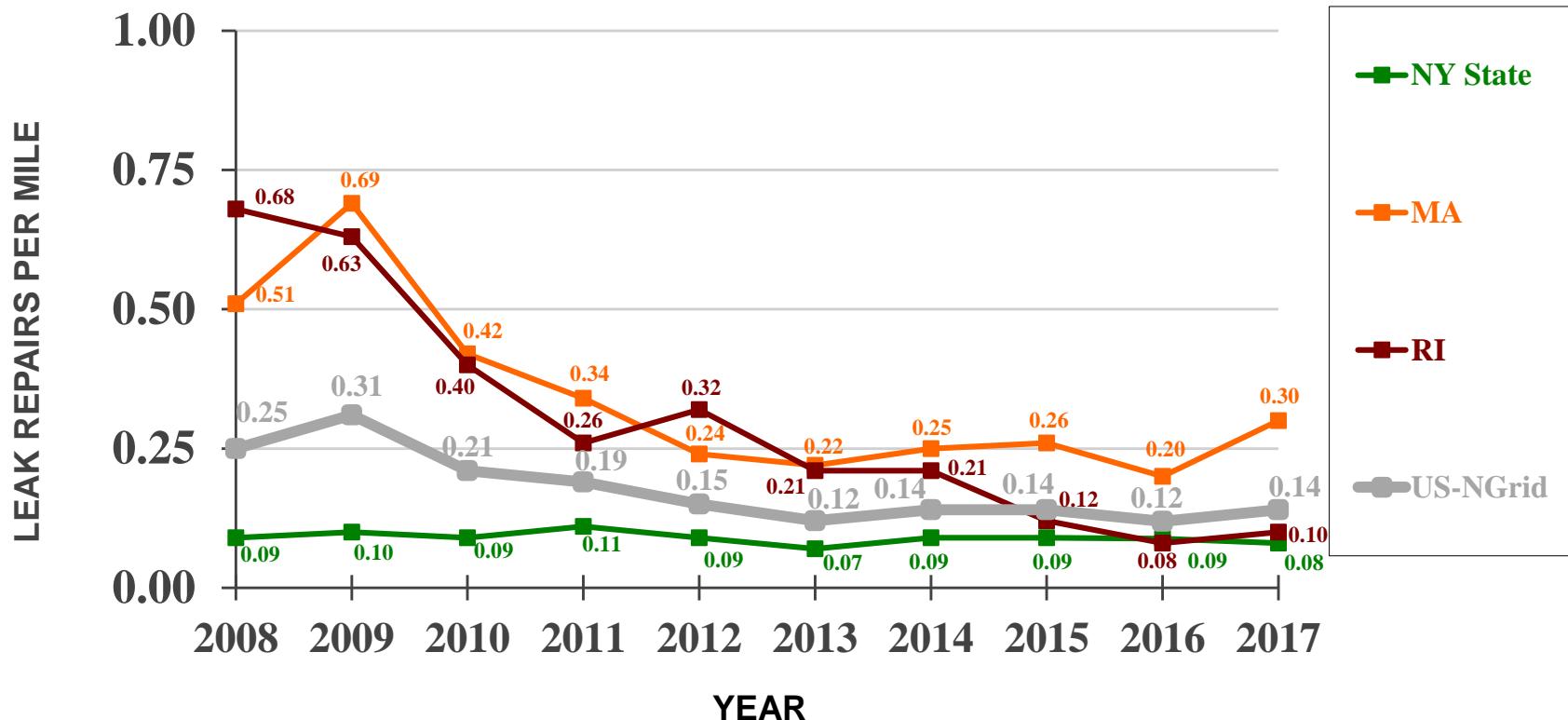


2017 SYSTEM INTEGRITY REPORT

MAIN CORROSION LEAK “RATES”

CORROSION Leak Repairs Per Mile of “TOTAL” Steel

INCLUDES ALL CORROSION LEAKS, REGARDLESS OF MAIN MATERIAL



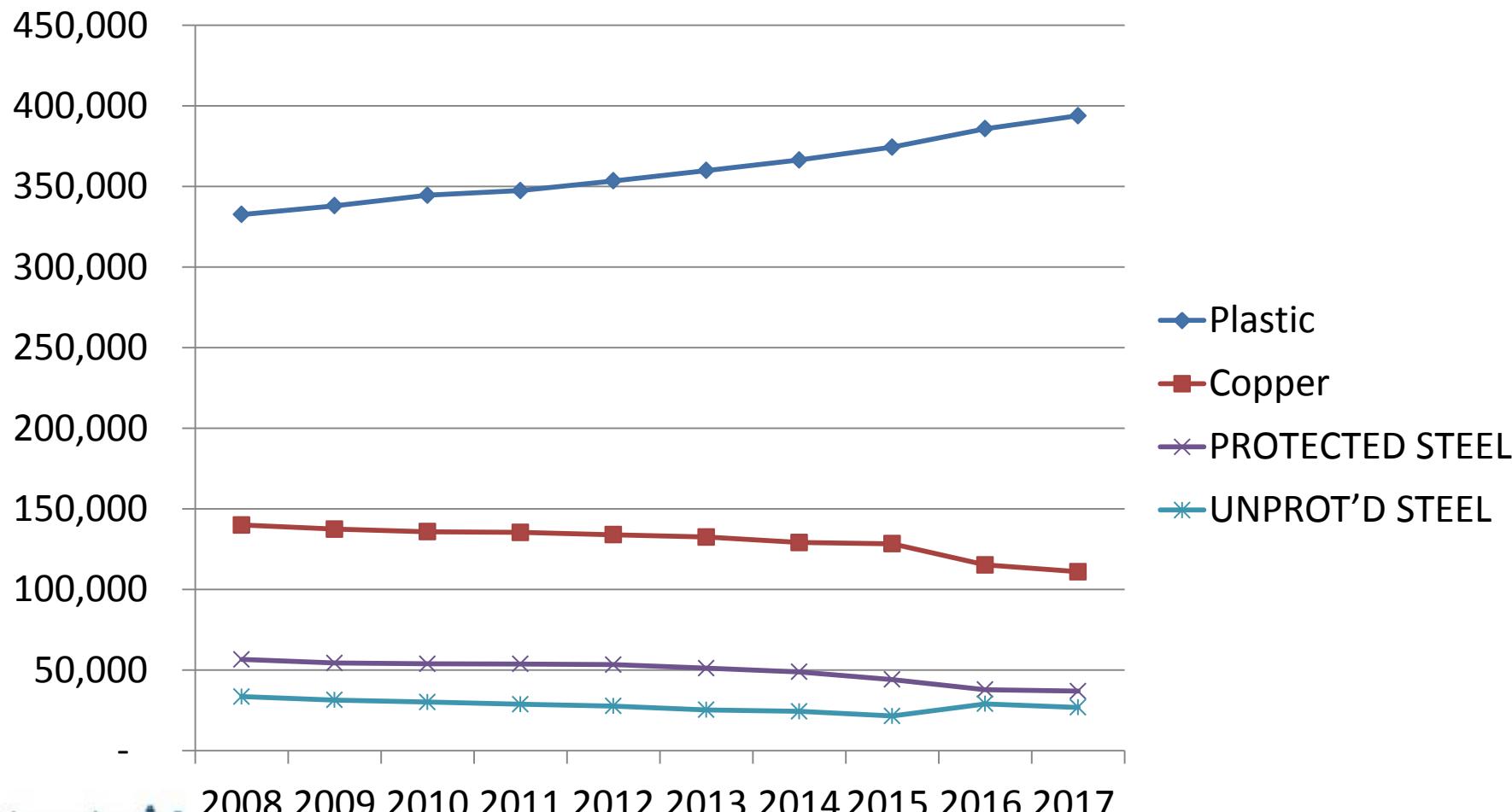
2017 SYSTEM INTEGRITY REPORT

SERVICE INVENTORY ANALYSIS

2017 SYSTEM INTEGRITY REPORT

NYC

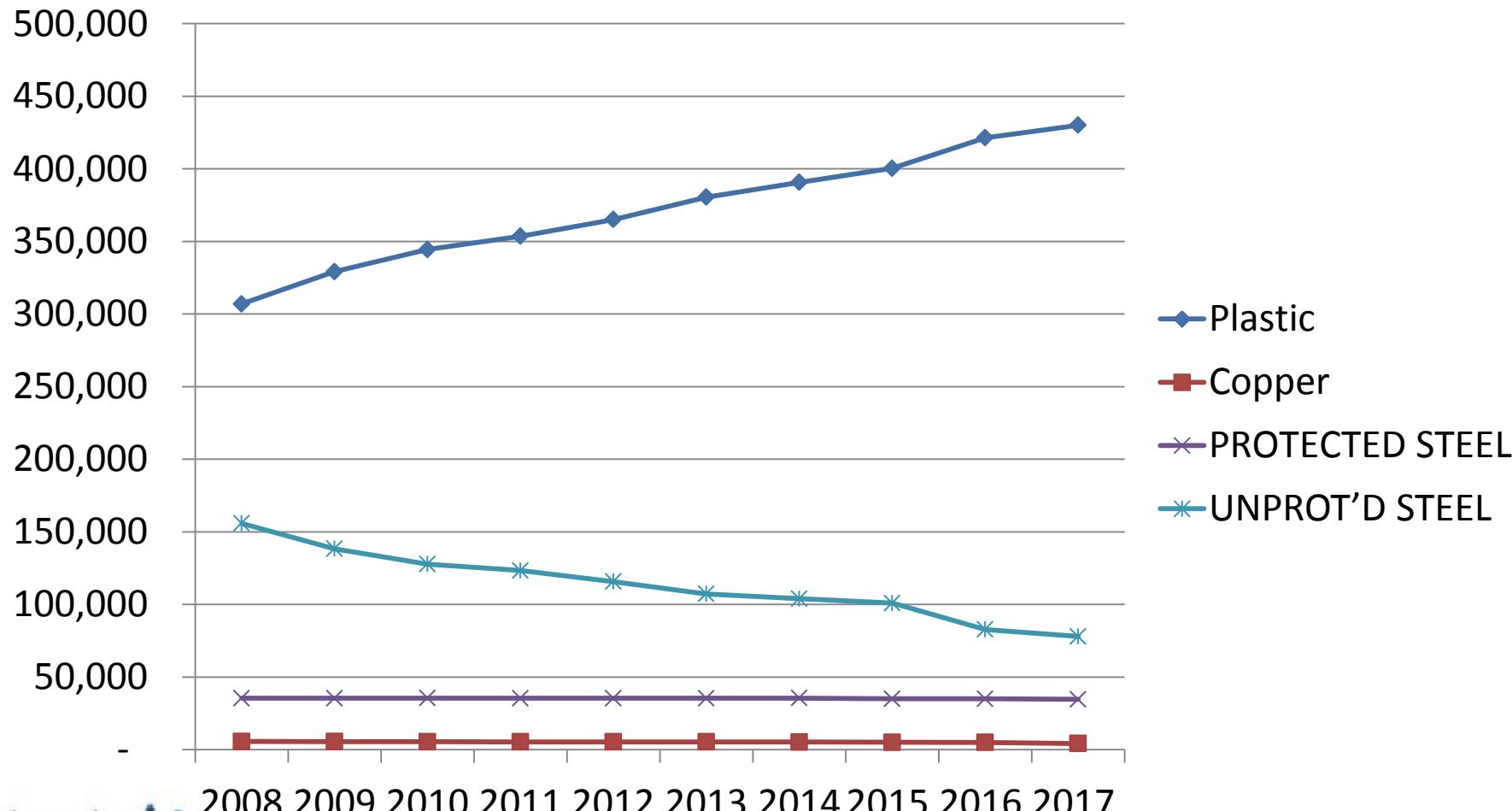
SERVICE INVENTORY TREND



Note: See number of services breakdown in appendix

2017 SYSTEM INTEGRITY REPORT

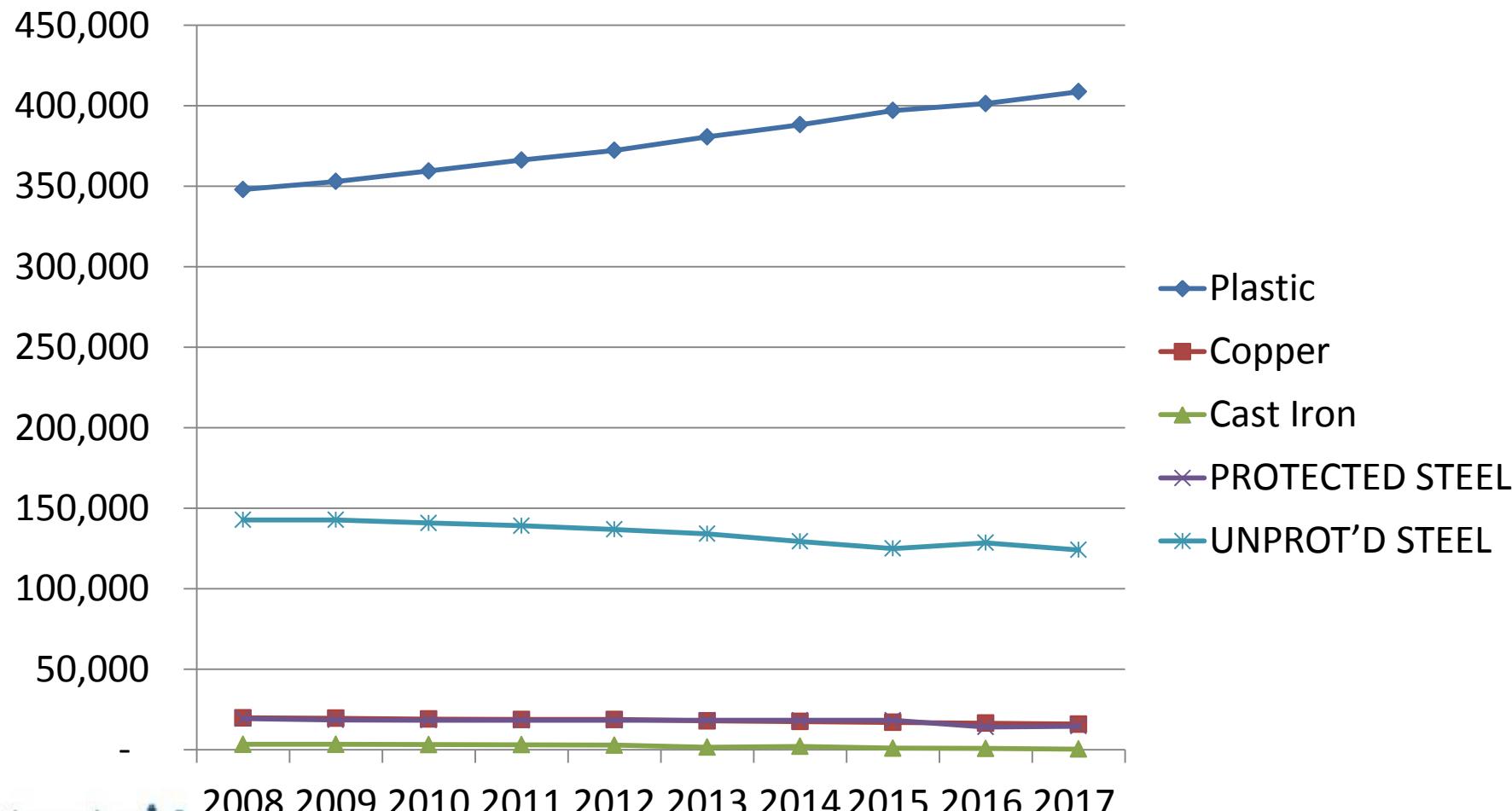
SERVICE INVENTORY TREND



2017 SYSTEM INTEGRITY REPORT

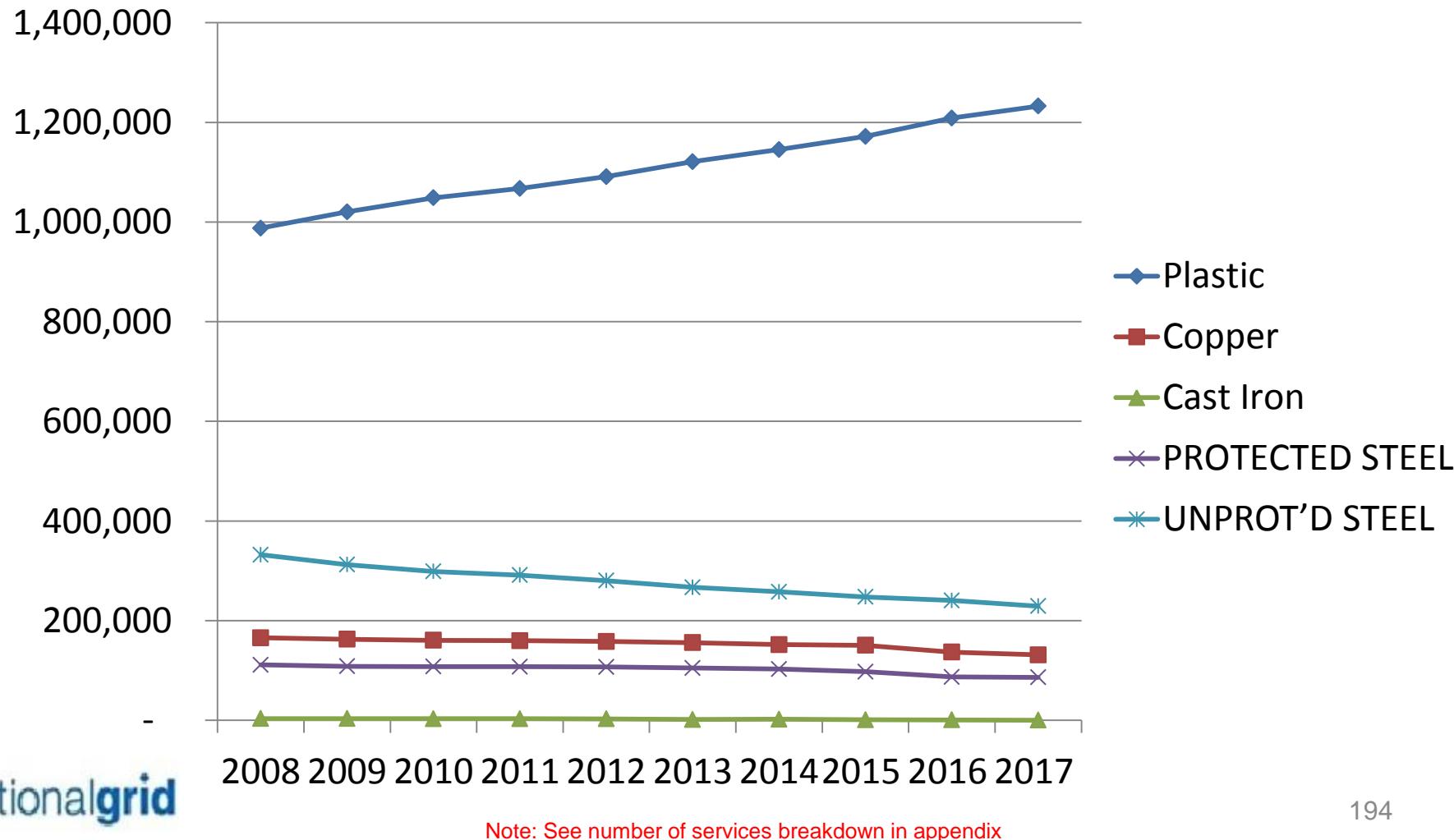
SERVICE INVENTORY TREND

UPSTATE



2017 SYSTEM INTEGRITY REPORT

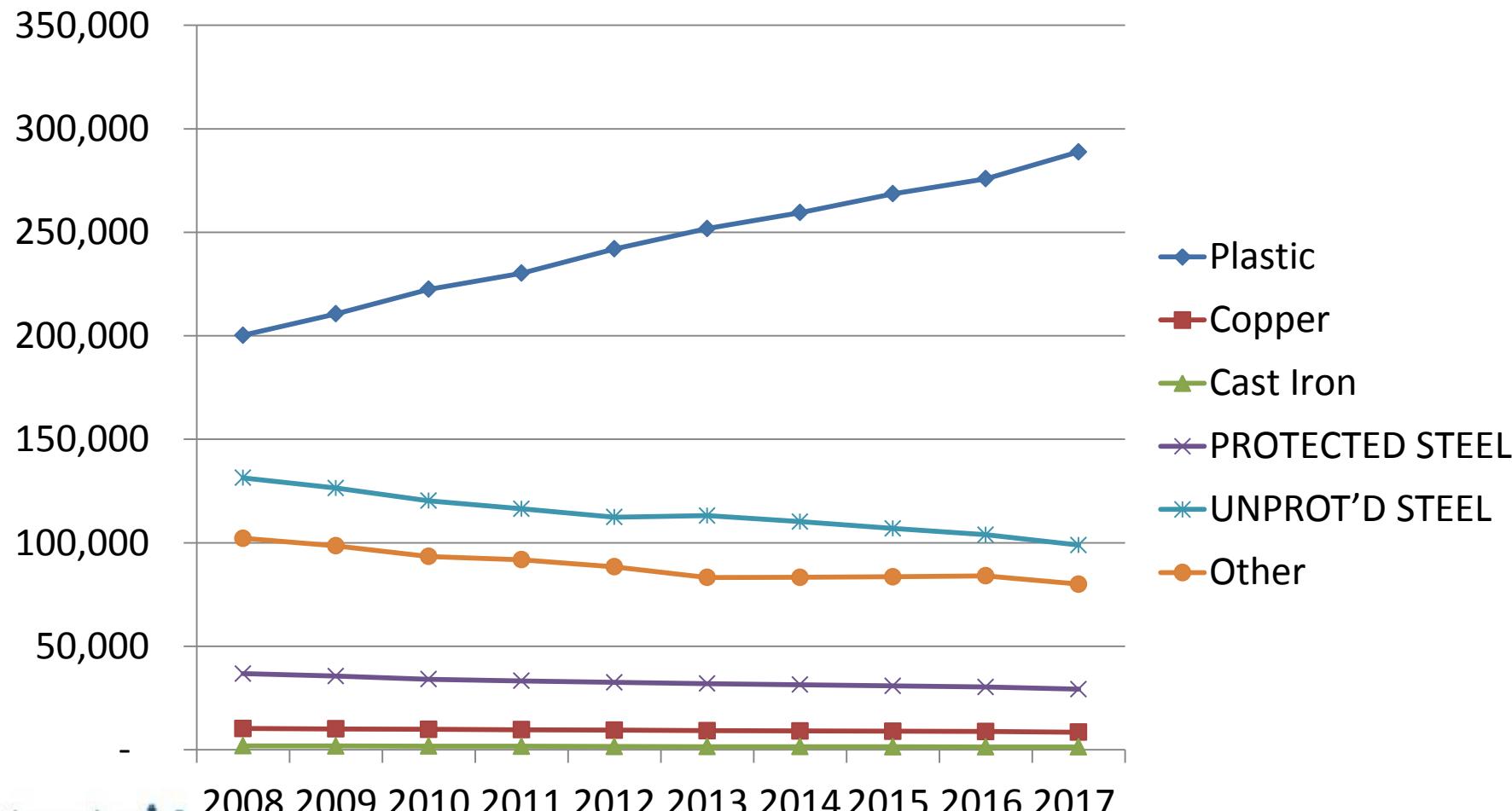
NY STATE SERVICE INVENTORY TREND



2017 SYSTEM INTEGRITY REPORT

BGC

SERVICE INVENTORY TREND

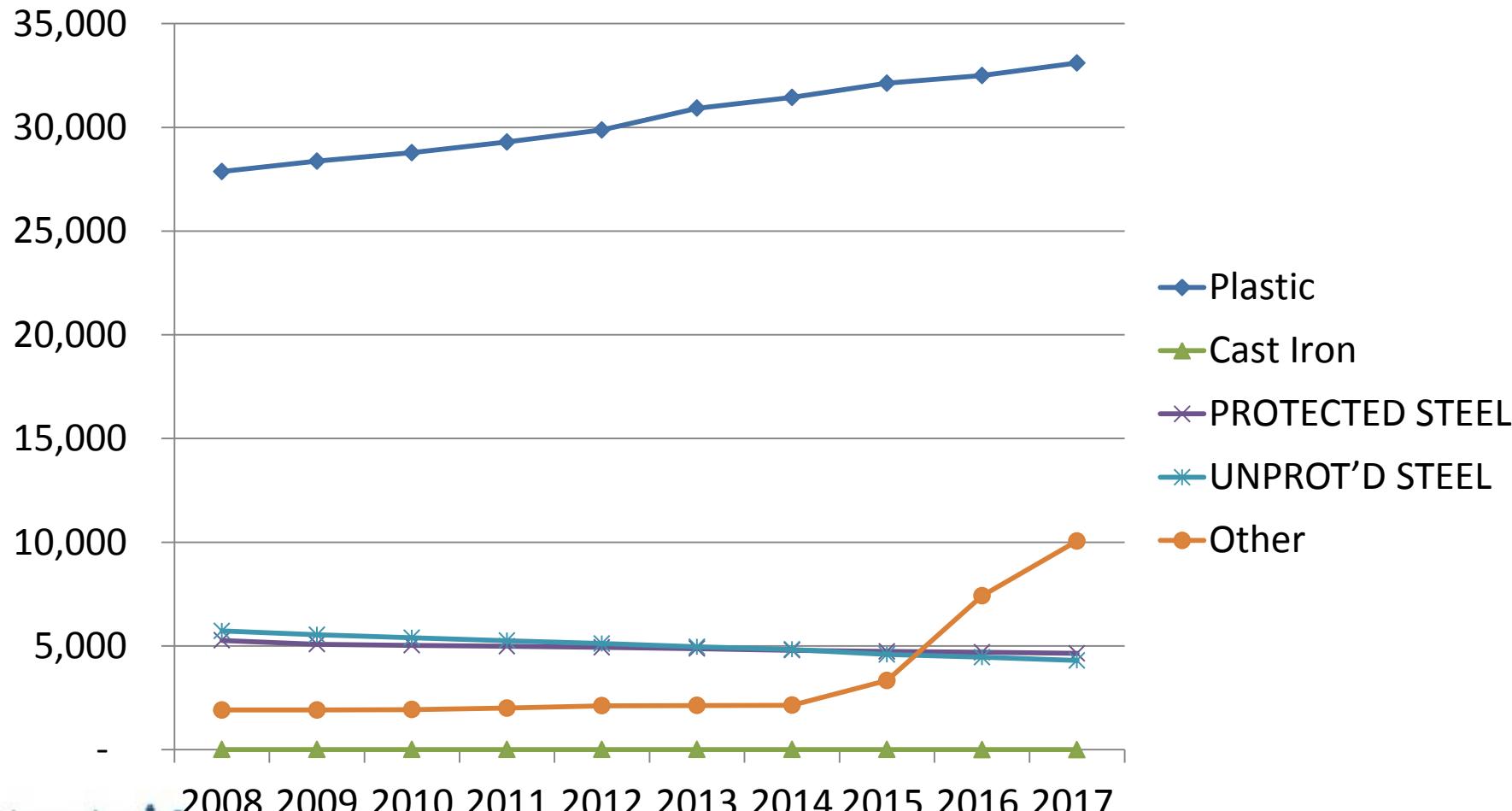


Note: See number of services breakdown in appendix

2017 SYSTEM INTEGRITY REPORT

EGC

SERVICE INVENTORY TREND



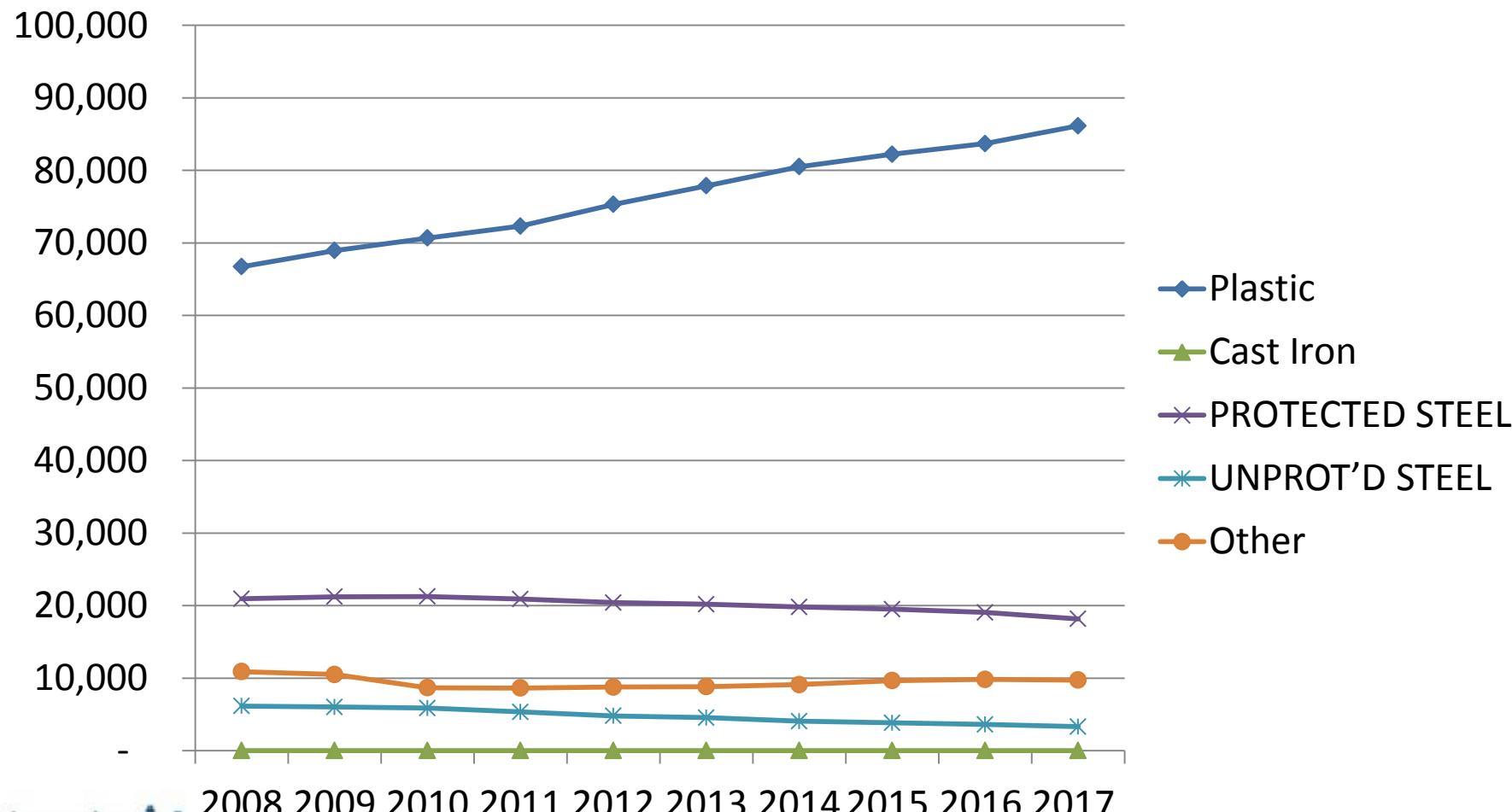
nationalgrid

Note: See number of services breakdown in appendix

2017 SYSTEM INTEGRITY REPORT

CAPE

SERVICE INVENTORY TREND

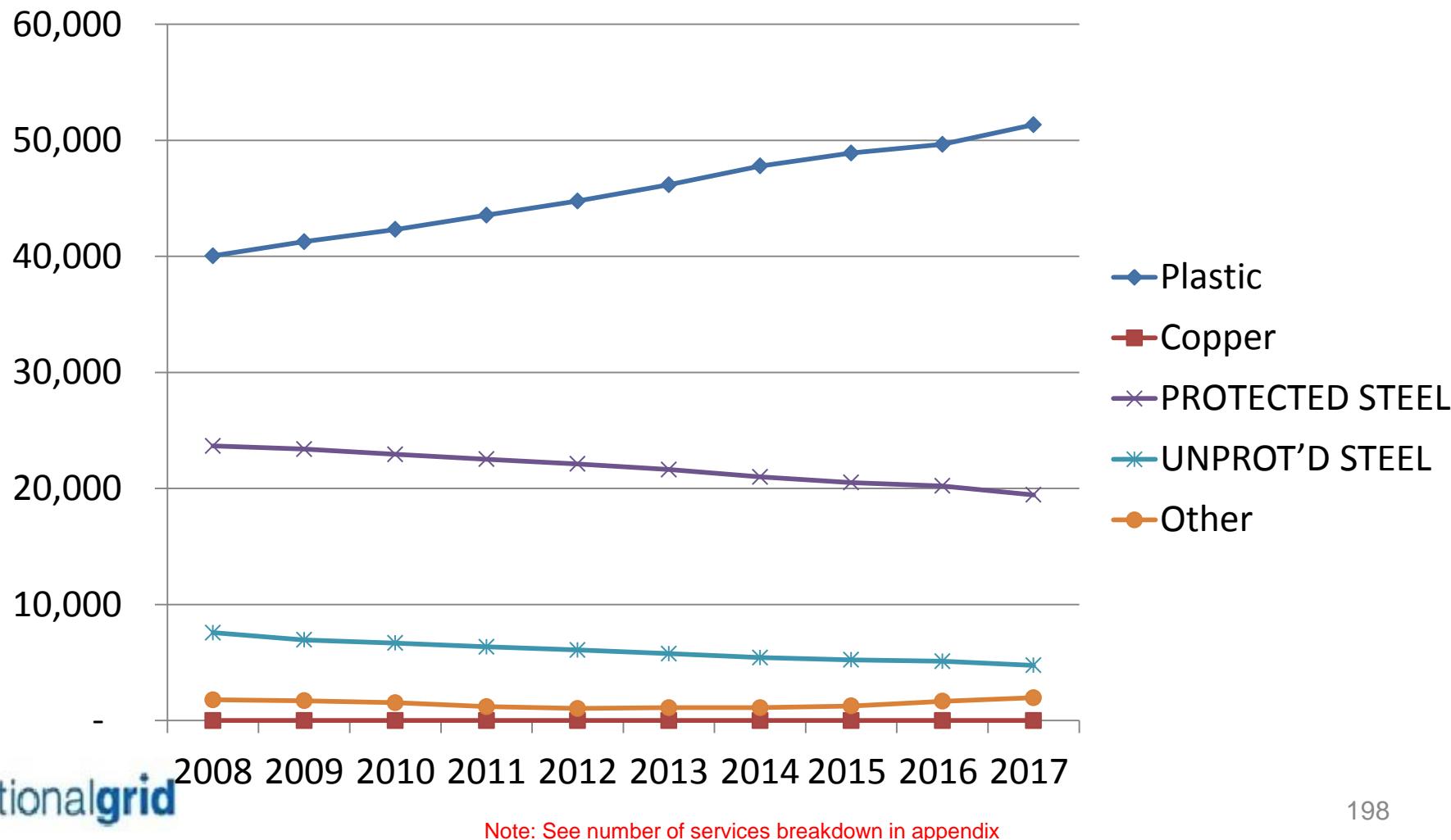


Note: See number of services breakdown in appendix

2017 SYSTEM INTEGRITY REPORT

LOWELL

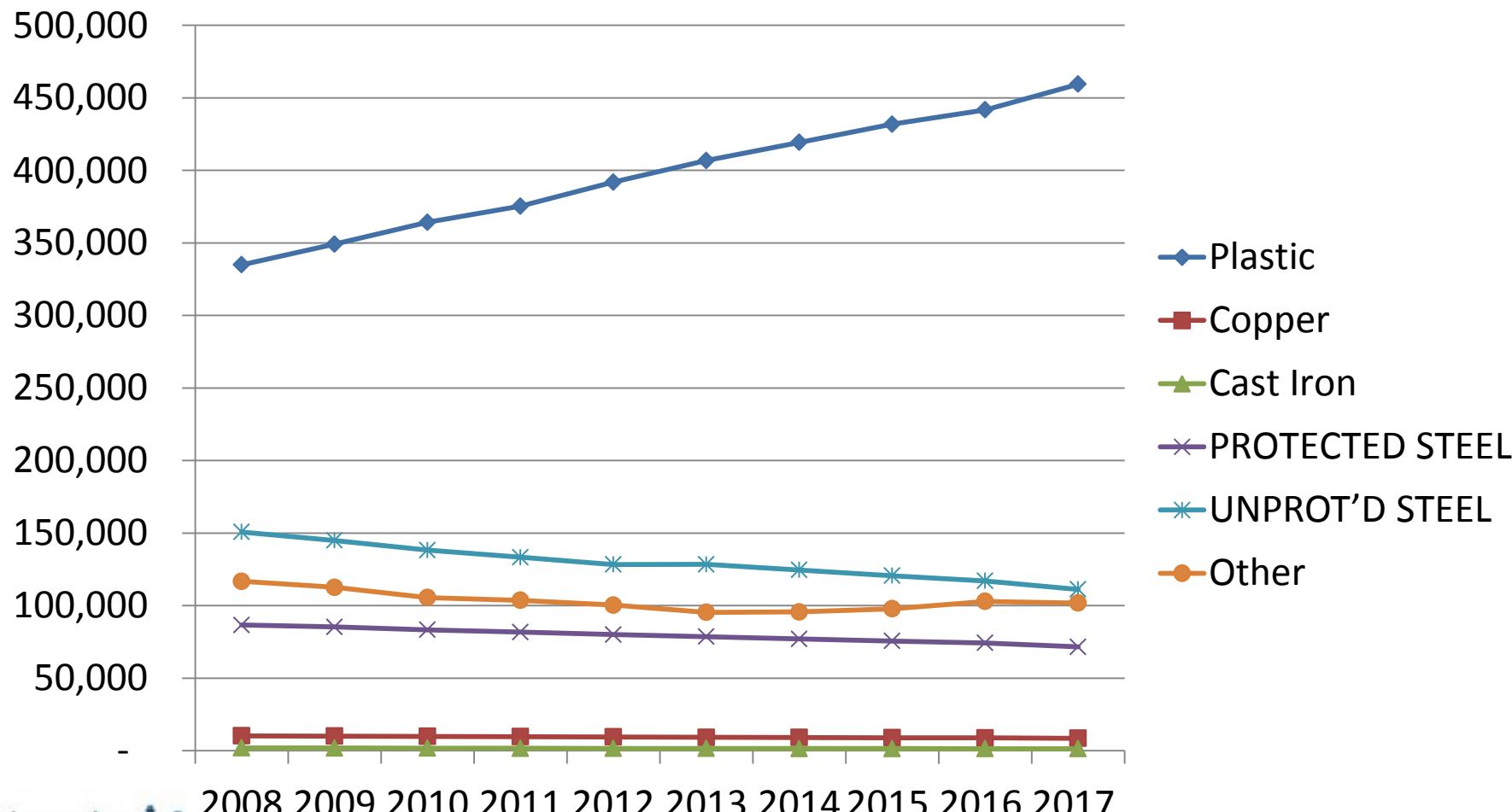
SERVICE INVENTORY TREND



2017 SYSTEM INTEGRITY REPORT

MA

SERVICE INVENTORY TREND

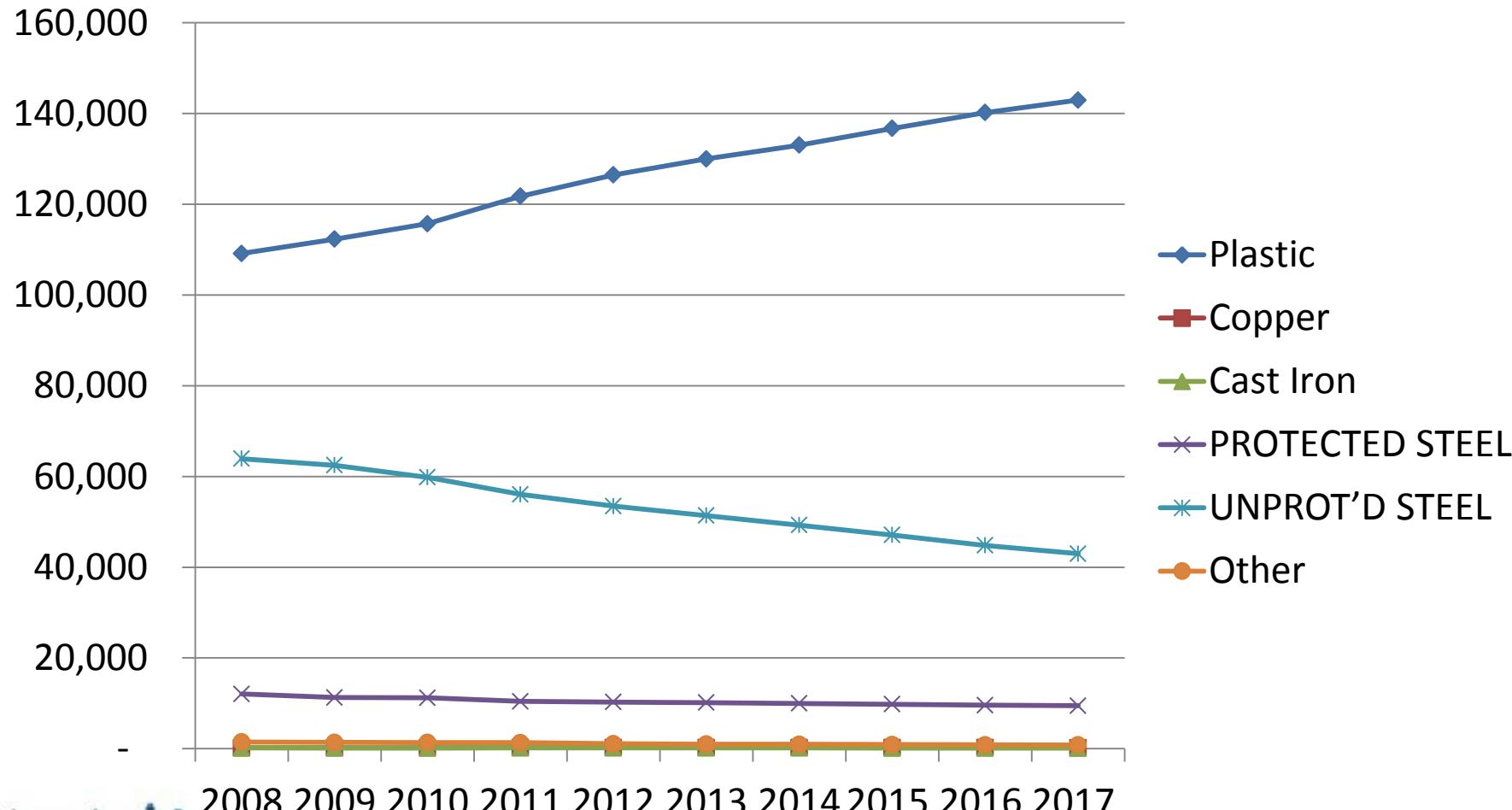


Note: See number of services breakdown in appendix

nationalgrid

2017 SYSTEM INTEGRITY REPORT

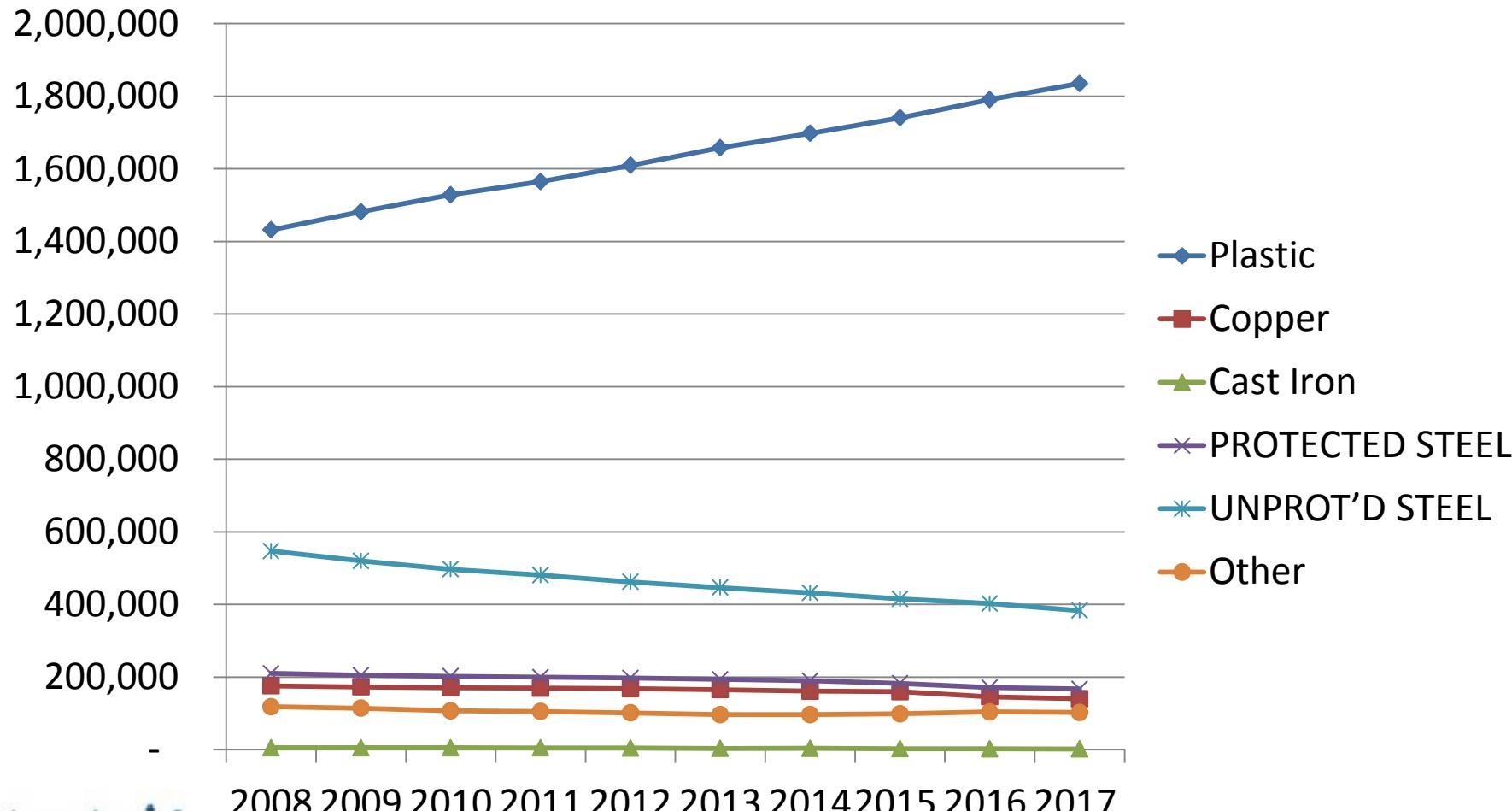
SERVICE INVENTORY TREND

RI**nationalgrid**

Note: See number of services breakdown in appendix

2017 SYSTEM INTEGRITY REPORT

US-NGrid SERVICE INVENTORY TRENDS



Note: See number of services breakdown in appendix

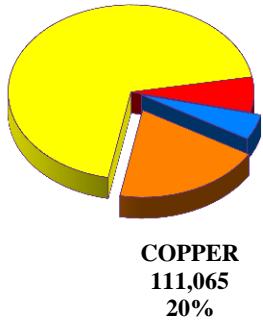
2017 SYSTEM INTEGRITY REPORT

SERVICE INVENTORY

NYC

568,846 SERVICES

PLASTIC
393,930
69%



PROT'D
STEEL
36,955
6%

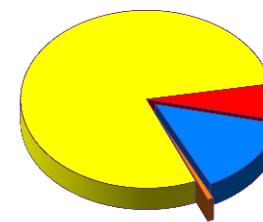
UNPROT'D
STEEL
26,896
5%

COPPER
111,065
20%

LI

546,925 SERVICES

PROT'D STEEL
34,628
6%



PLASTIC
430,006
79%

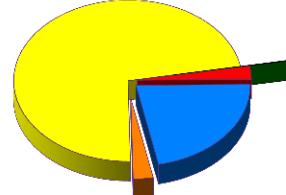
COPPER
4,290
1%

UNPROT'D
STEEL
78,001
14%

Upstate

563,914 SERVICES

PLASTIC
408,725
72%



OTHER (incl CI)
862
<1%

PROT'D STEEL
14,710
3%

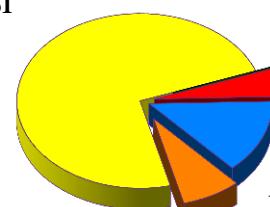
UNPROT'D
STEEL
124,123
22%

COPPER
15,939
3%

NY State

1,679,685 SERVICES

PLASTIC
1,232,661
73%



OTHER (incl CI)
417
0%

PROT'D STEEL
86,293
5%

UNPROT'D
STEEL
229,020
14%

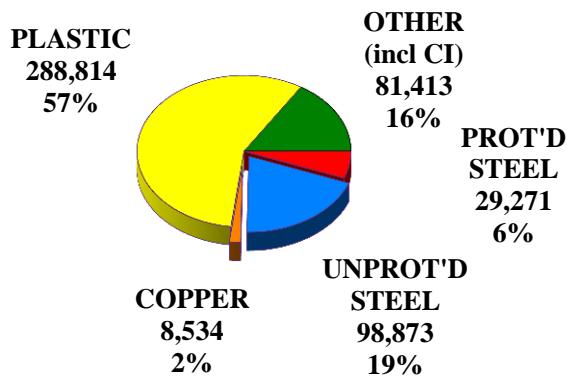
COPPER
131,294
8%

2017 SYSTEM INTEGRITY REPORT

SERVICE INVENTORY

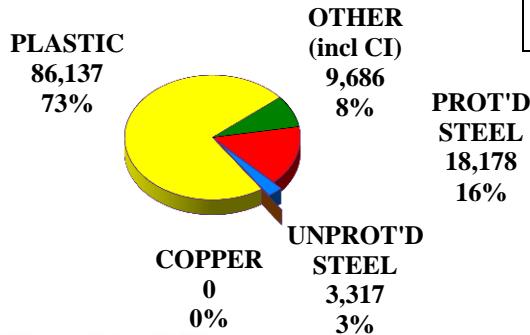
BGC

506,905 SERVICES



CAPE

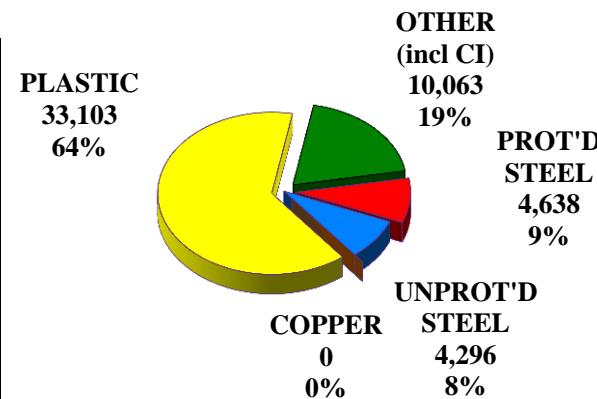
117,390 SERVICES



nationalgrid

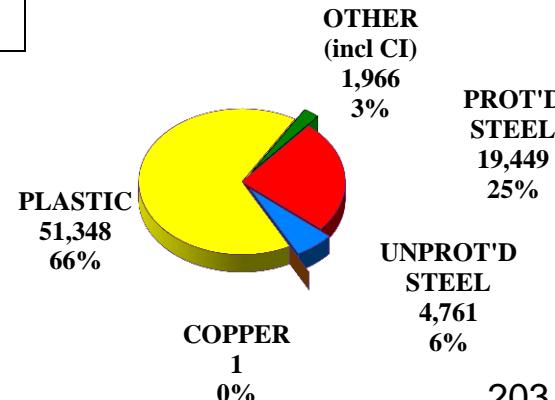
EGC

52,100 SERVICES



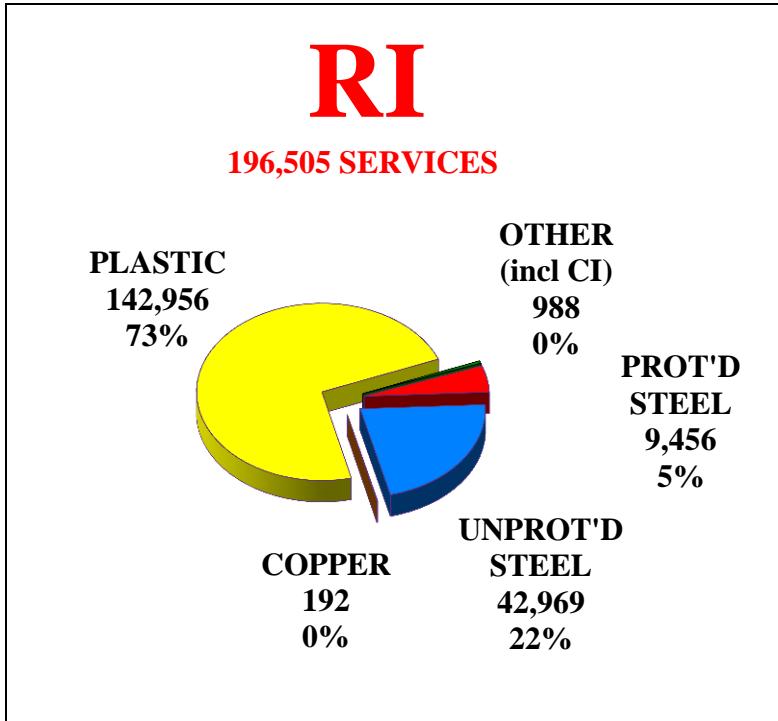
LOWELL

77,525 SERVICES



2017 SYSTEM INTEGRITY REPORT

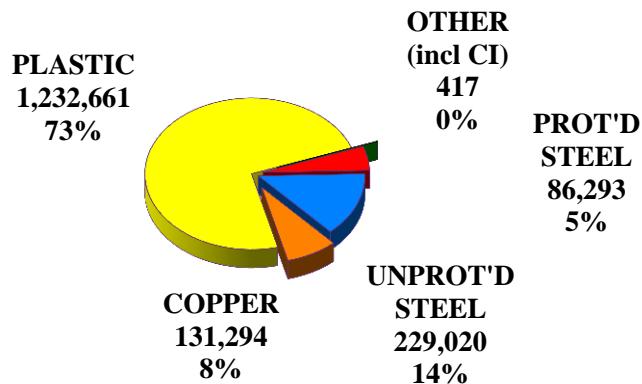
SERVICE INVENTORY



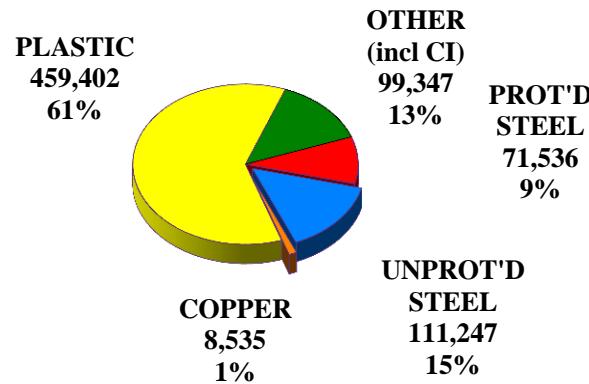
2017 SYSTEM INTEGRITY REPORT

SERVICE INVENTORY

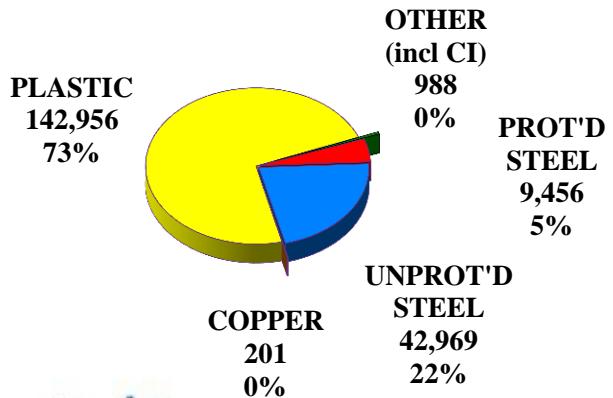
NY State 1,679,685 SERVICES



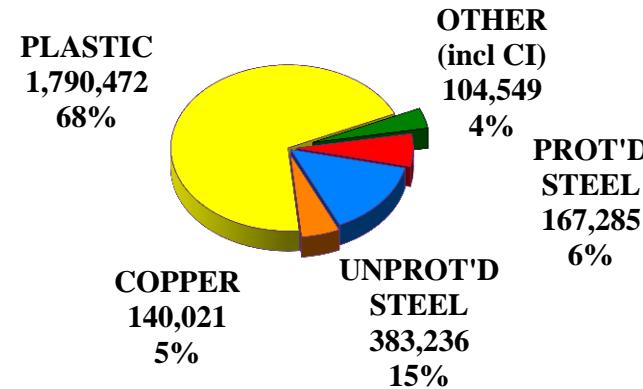
MA 753,920 SERVICES



RI 196,505 SERVICES



US-NGrid 2,630,110 SERVICES



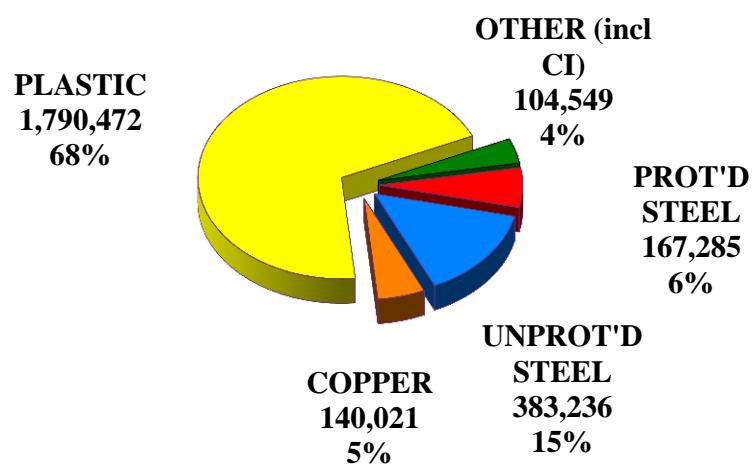
2017 SYSTEM INTEGRITY REPORT

2017 SERVICE INVENTORY

U.S. COMPARATIVE SUMMARY

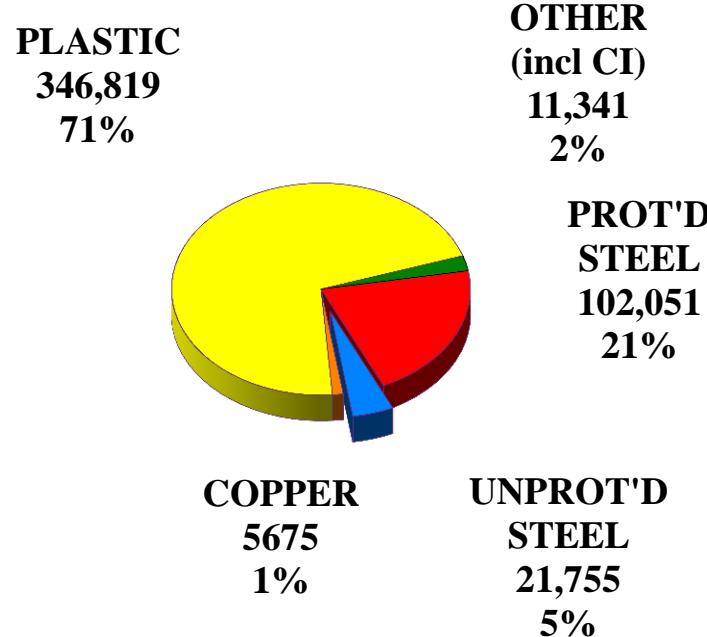
National Grid - US

2,630,110 SERVICES



PHMSA Average

487,640 SERVICES



2017 SYSTEM INTEGRITY REPORT

SERVICE LEAK REPAIR ANALYSIS

NOTE: Above Ground Leaks, which are included in the DOT Reports (beginning in 2012), are excluded from this report in order to maintain the integrity of our trend analyses for distribution (not CMS) piping.

2017 SYSTEM INTEGRITY REPORT

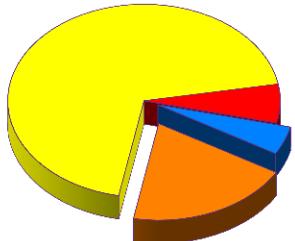
NYC

TOTAL SERVICE LEAK REPAIRS INCLUDING Damages

TOTAL SERVICE INVENTORY BY MATERIAL

568,846 SERVICES

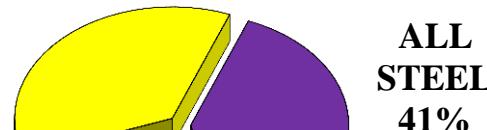
PLASTIC
69%



TOTAL SERVICE LEAK REPAIRS BY MATERIAL

1,412 LEAKS

PLASTIC
37%



2017 SYSTEM INTEGRITY REPORT

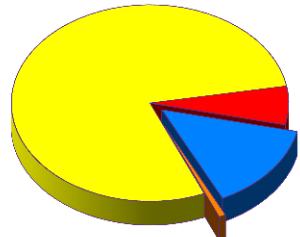


TOTAL SERVICE LEAK REPAIRS INCLUDING Damages

TOTAL SERVICE INVENTORY BY MATERIAL

544,174 SERVICES

PLASTIC
79%



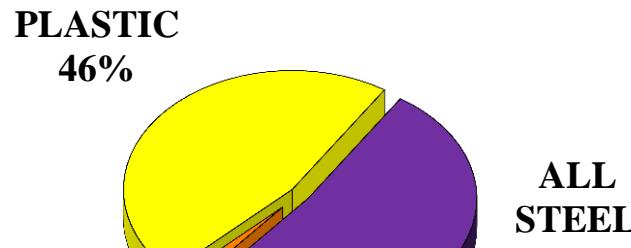
COPPER
1%

PROT'D
STEEL
6%

UNPROT'D
STEEL
14%

TOTAL SERVICE LEAK REPAIRS BY MATERIAL

1,834 LEAKS



COPPER
2%

ALL
STEEL
52%

2017 SYSTEM INTEGRITY REPORT

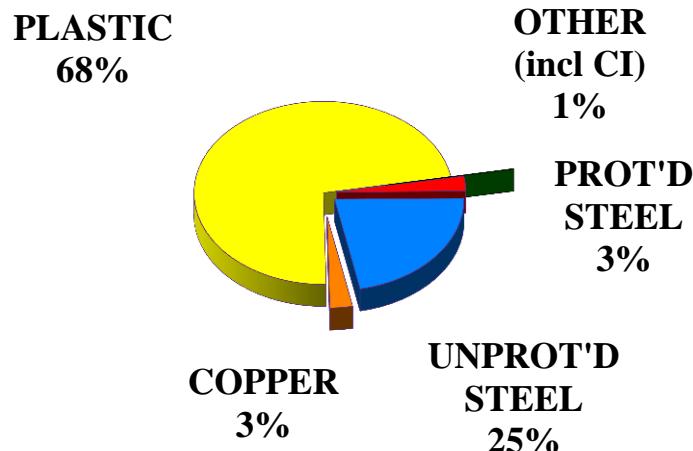
TOTAL SERVICE LEAK REPAIRS

UPSTATE

INCLUDING Damages

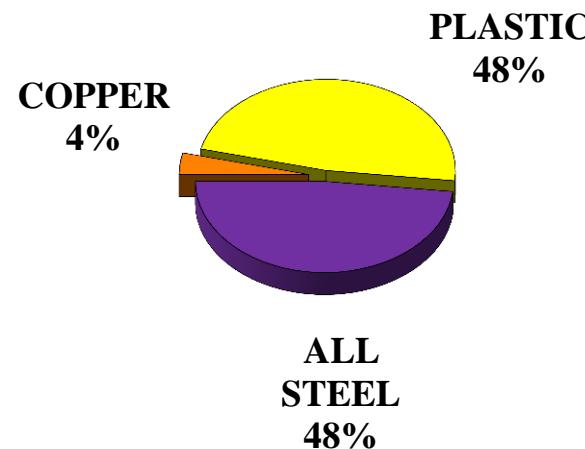
TOTAL SERVICE INVENTORY
BY MATERIAL

563,914 SERVICES



TOTAL SERVICE LEAK REPAIRS
BY MATERIAL

952 LEAKS



2017 SYSTEM INTEGRITY REPORT

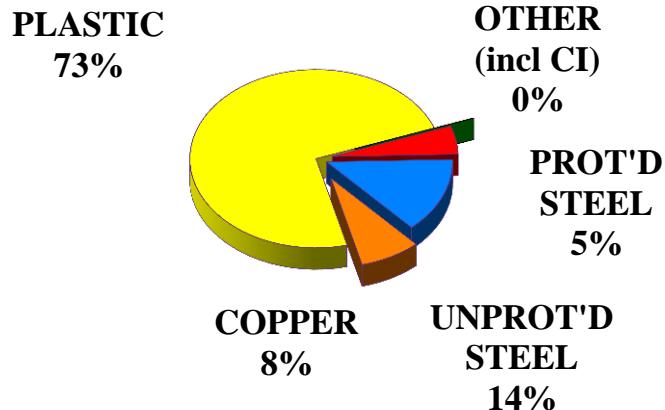
TOTAL SERVICE LEAK REPAIRS

NY State

INCLUDING Damages

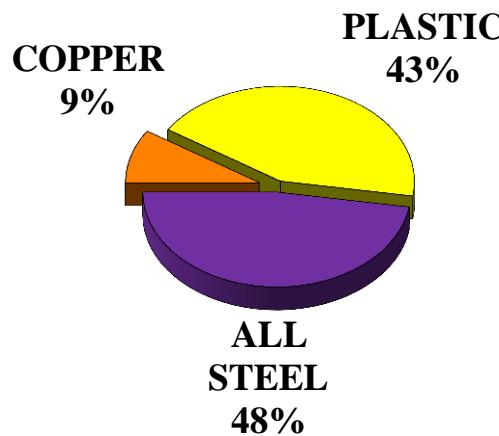
TOTAL SERVICE INVENTORY BY MATERIAL

1,679,685 SERVICES



TOTAL SERVICE LEAK REPAIRS BY MATERIAL

4,171 LEAKS



IMPORTANT: Service Repairs are identified by the service material. This is not necessarily the material that leaked.
For example - a leak caused by corrosion of a steel valve or fitting on a plastic service is shown as a plastic service leak.

2017 SYSTEM INTEGRITY REPORT

TOTAL SERVICE LEAK REPAIRS

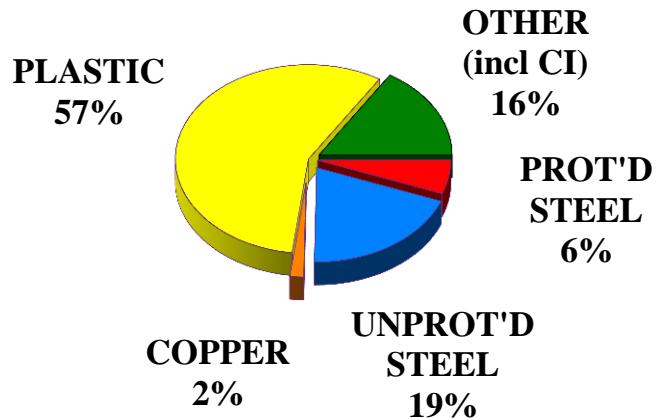
BGC

INCLUDING Damages

TOTAL SERVICE INVENTORY

BY MATERIAL

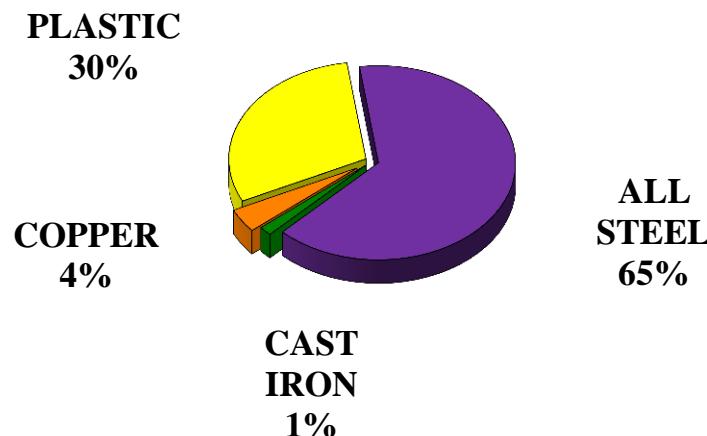
506,905 SERVICES



TOTAL SERVICE LEAK REPAIRS

BY MATERIAL

2,839 LEAKS



IMPORTANT: Service Repairs are identified by the service material. This is not necessarily the material that leaked.
For example - a leak caused by corrosion of a steel valve or fitting on a plastic service is shown as a plastic service leak.

2017 SYSTEM INTEGRITY REPORT

TOTAL SERVICE LEAK REPAIRS

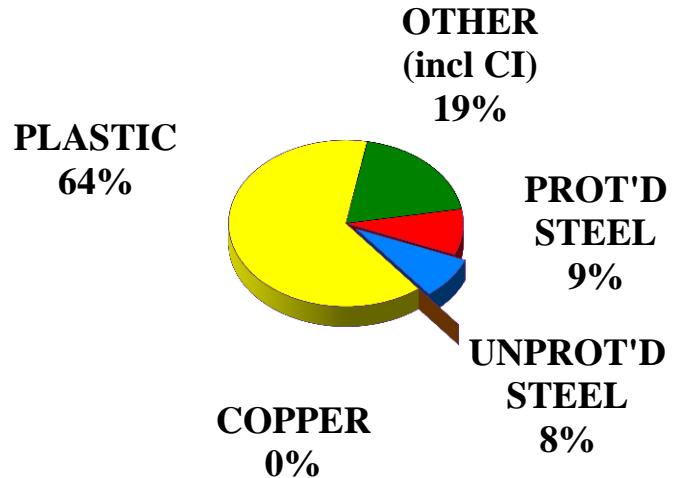
EGC

INCLUDING Damages

TOTAL SERVICE INVENTORY

BY MATERIAL

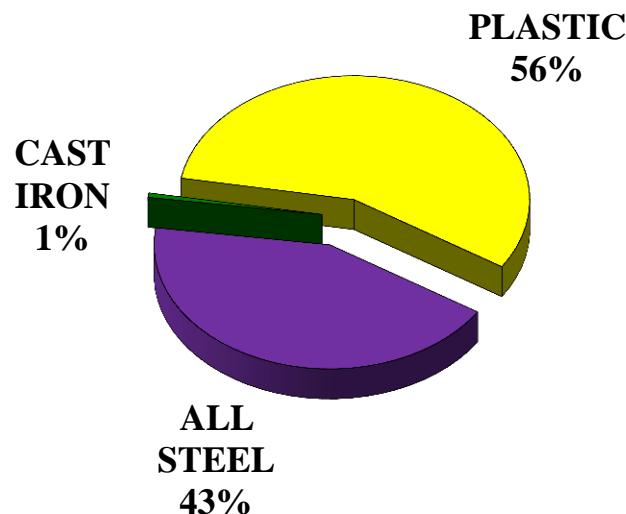
52,100 SERVICES



TOTAL SERVICE LEAK REPAIRS

BY MATERIAL

174 LEAKS



2017 SYSTEM INTEGRITY REPORT

TOTAL SERVICE LEAK REPAIRS

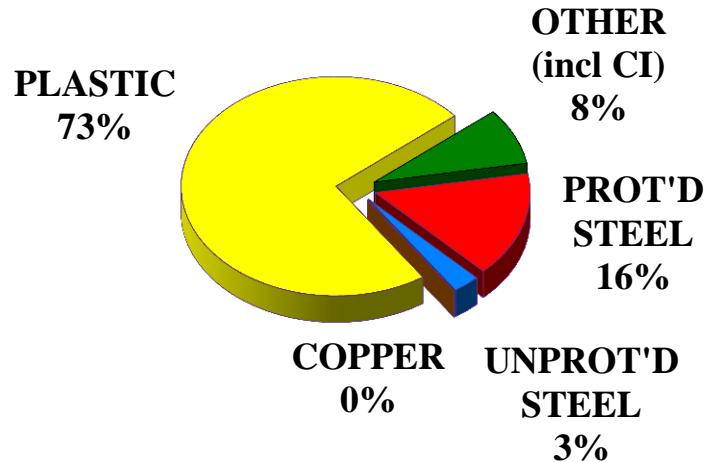
CAPE

INCLUDING Damages

TOTAL SERVICE INVENTORY

BY MATERIAL

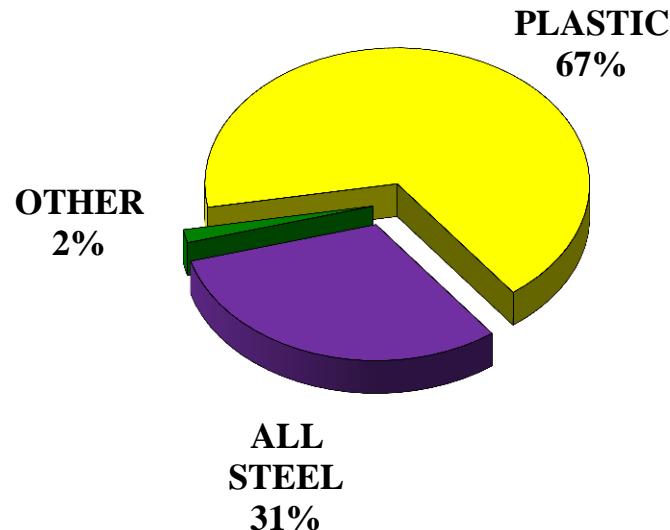
117,390 SERVICES



TOTAL SERVICE LEAK REPAIRS

BY MATERIAL

321 LEAKS



2017 SYSTEM INTEGRITY REPORT

TOTAL SERVICE LEAK REPAIRS

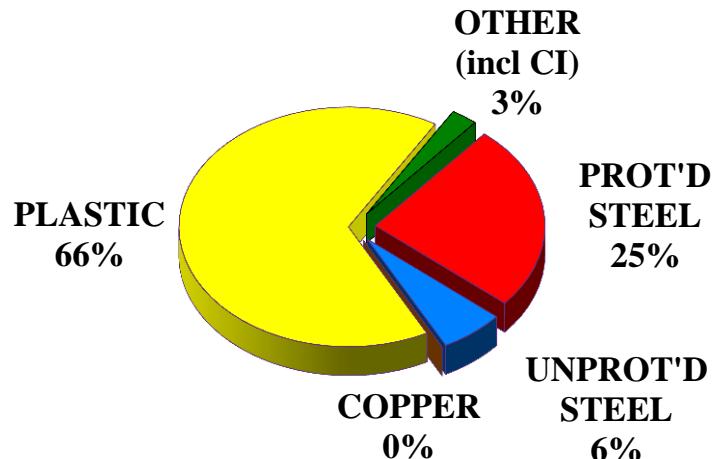
LOWELL

INCLUDING Damages

TOTAL SERVICE INVENTORY

BY MATERIAL

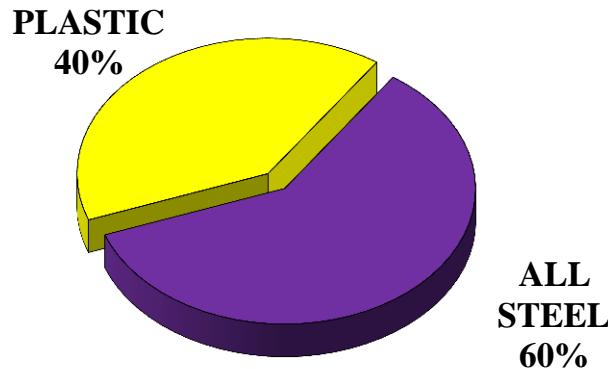
77,525 SERVICES



TOTAL SERVICE LEAK REPAIRS

BY MATERIAL

231 LEAKS



2017 SYSTEM INTEGRITY REPORT

TOTAL SERVICE LEAK REPAIRS

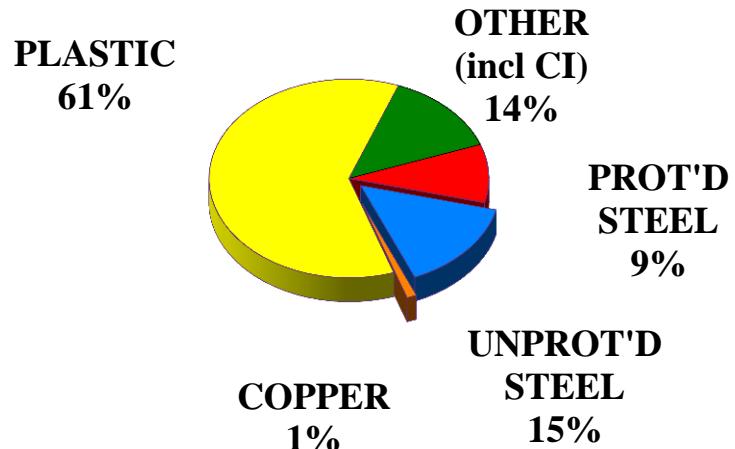
MA

INCLUDING Damages

TOTAL SERVICE INVENTORY

BY MATERIAL

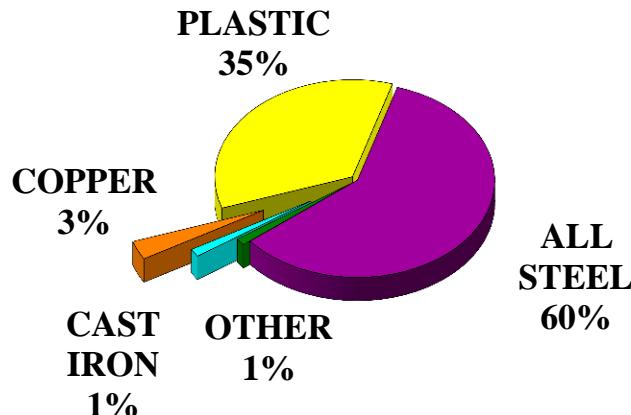
746,313 SERVICES



TOTAL SERVICE LEAK REPAIRS

BY MATERIAL

3,565 LEAKS



2017 SYSTEM INTEGRITY REPORT

TOTAL SERVICE LEAK REPAIRS

RI

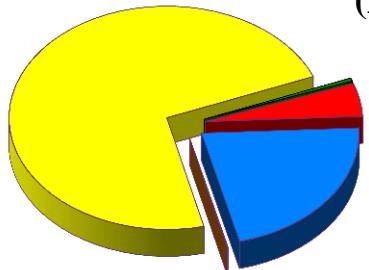
INCLUDING Damages

TOTAL SERVICE INVENTORY

BY MATERIAL

196,505 SERVICES

PLASTIC
73%



COPPER
0%

OTHER
(incl CI)
0%

PROT'D
STEEL
5%

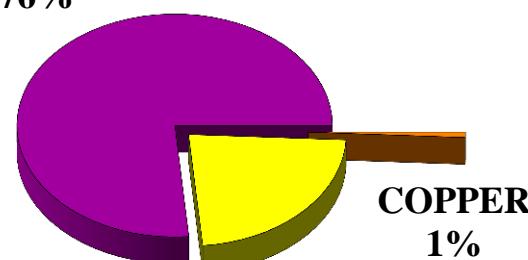
UNPROT'D
STEEL
22%

TOTAL SERVICE LEAK REPAIRS

BY MATERIAL

654 LEAKS

ALL
STEEL
76%



PLASTIC
23%

COPPER
1%

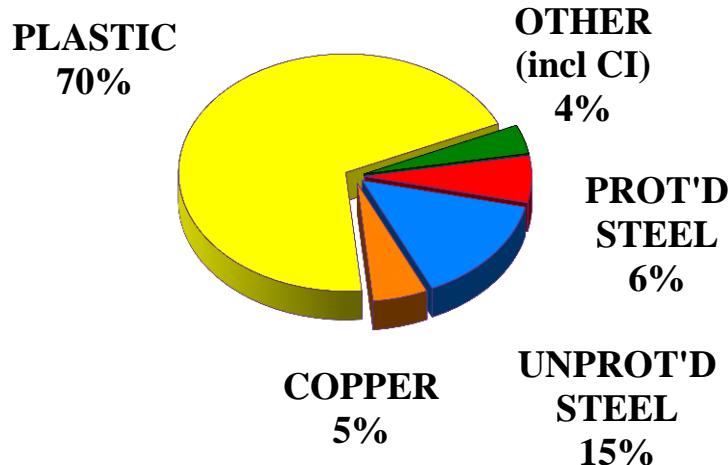
2017 SYSTEM INTEGRITY REPORT

TOTAL SERVICE LEAK REPAIRS

US-NGrid INCLUDING Damages

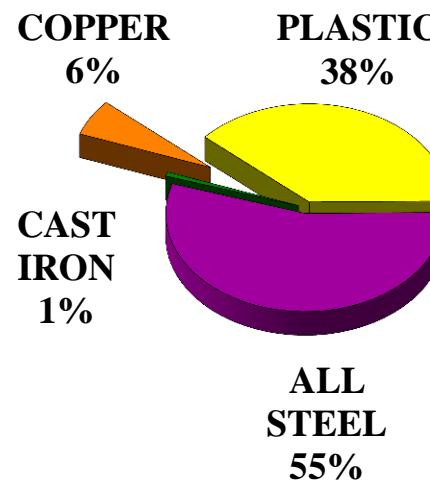
TOTAL SERVICE INVENTORY BY MATERIAL

2,630,110 SERVICES



TOTAL SERVICE LEAK REPAIRS BY MATERIAL

8,390 LEAKS



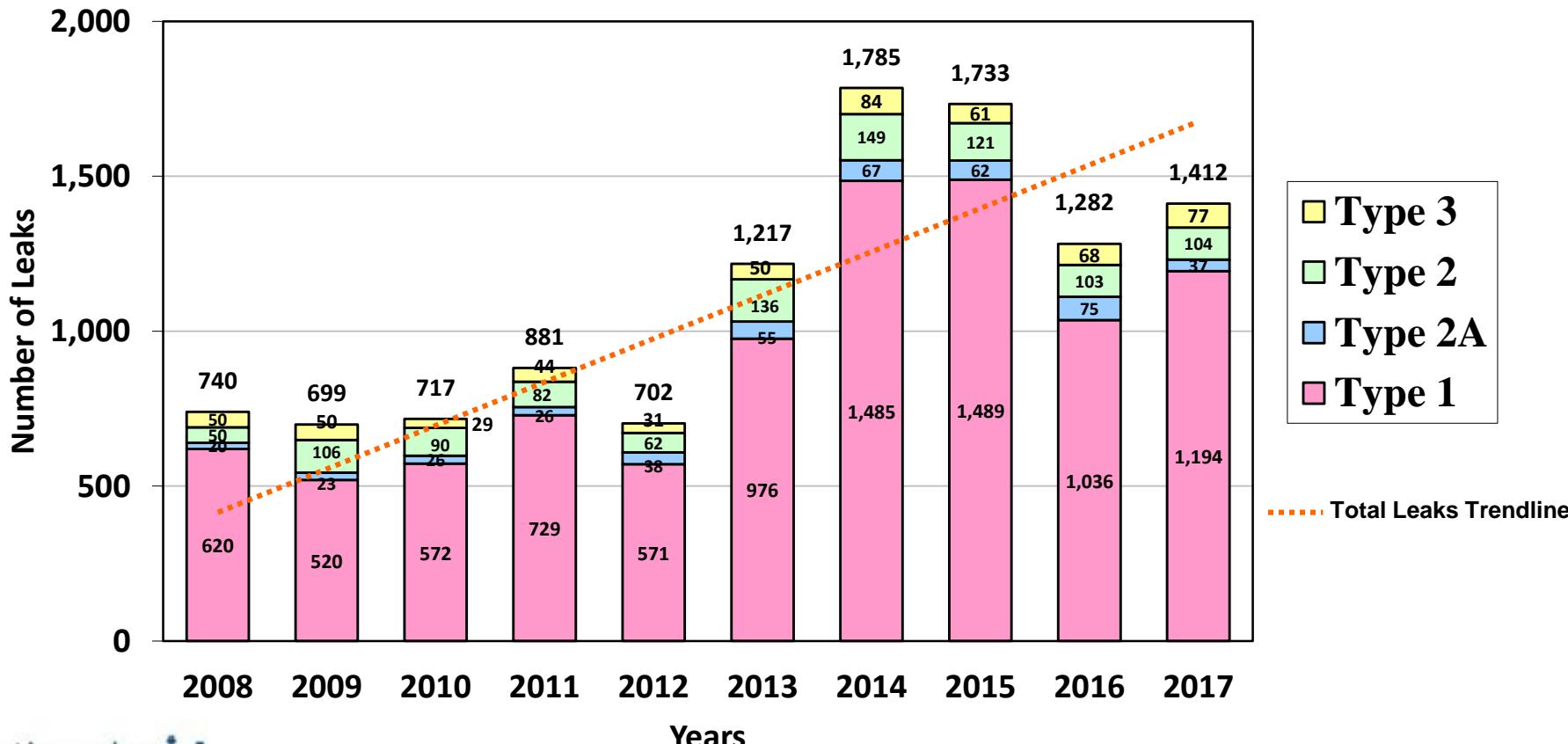
2017 SYSTEM INTEGRITY REPORT

NYC

LEAKS REPAIRED By REPAIRED Type

SERVICE

(Including Damages)



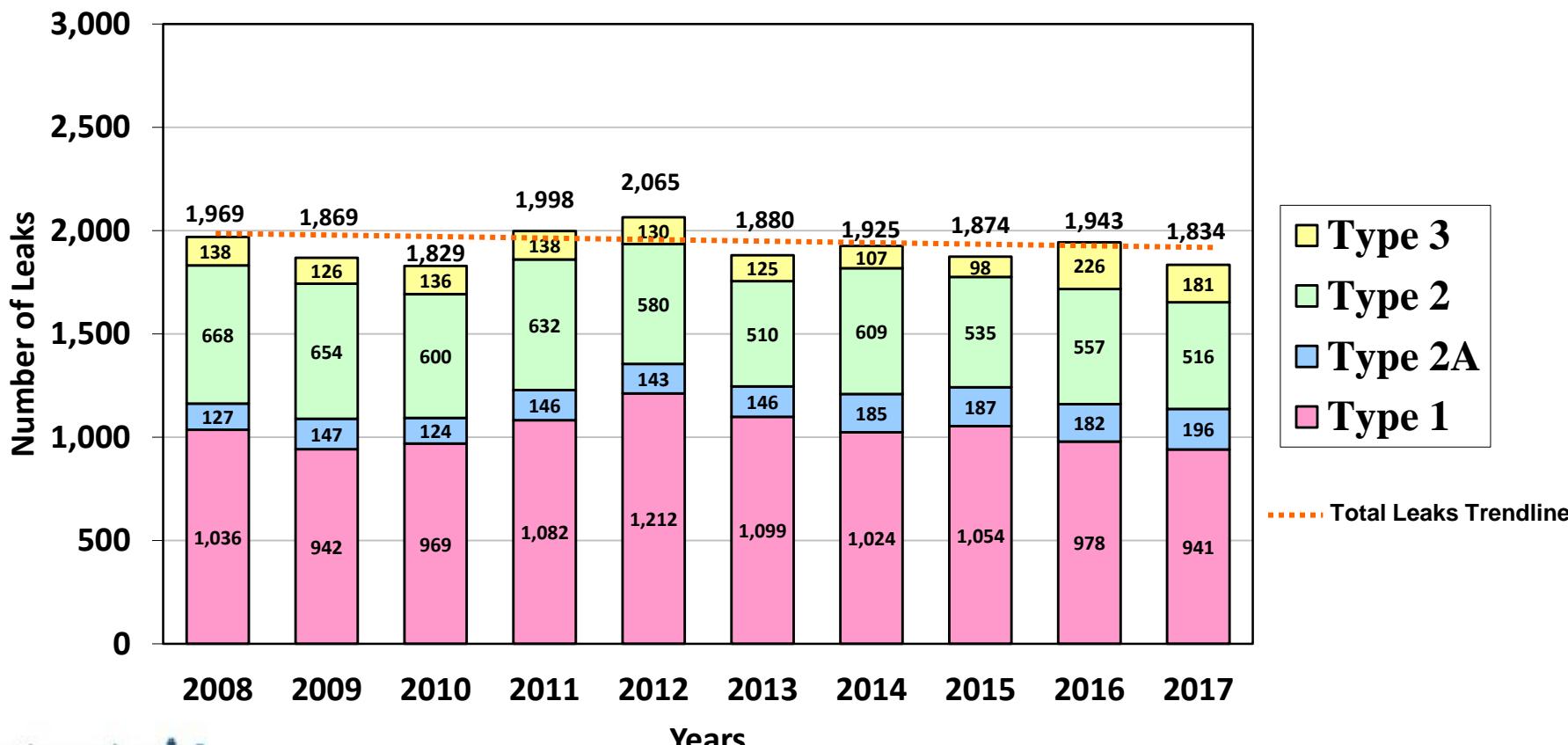
2017 SYSTEM INTEGRITY REPORT

LI

LEAKS REPAIRED By REPAIRED Type

SERVICE

(Including Damages)



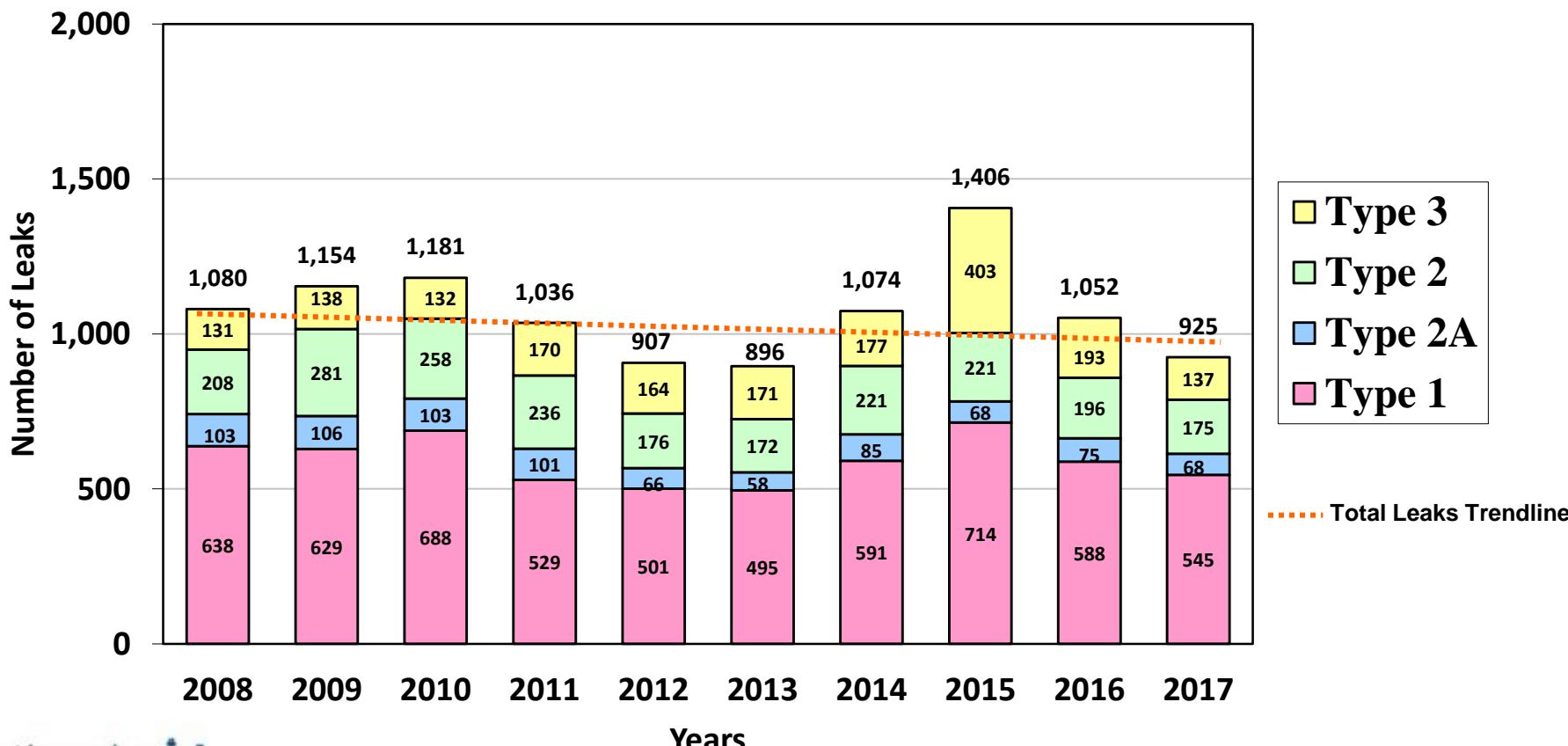
2017 SYSTEM INTEGRITY REPORT

UPSTATE

LEAKS REPAIRED By REPAIRED Type

SERVICE

(Including Damages)



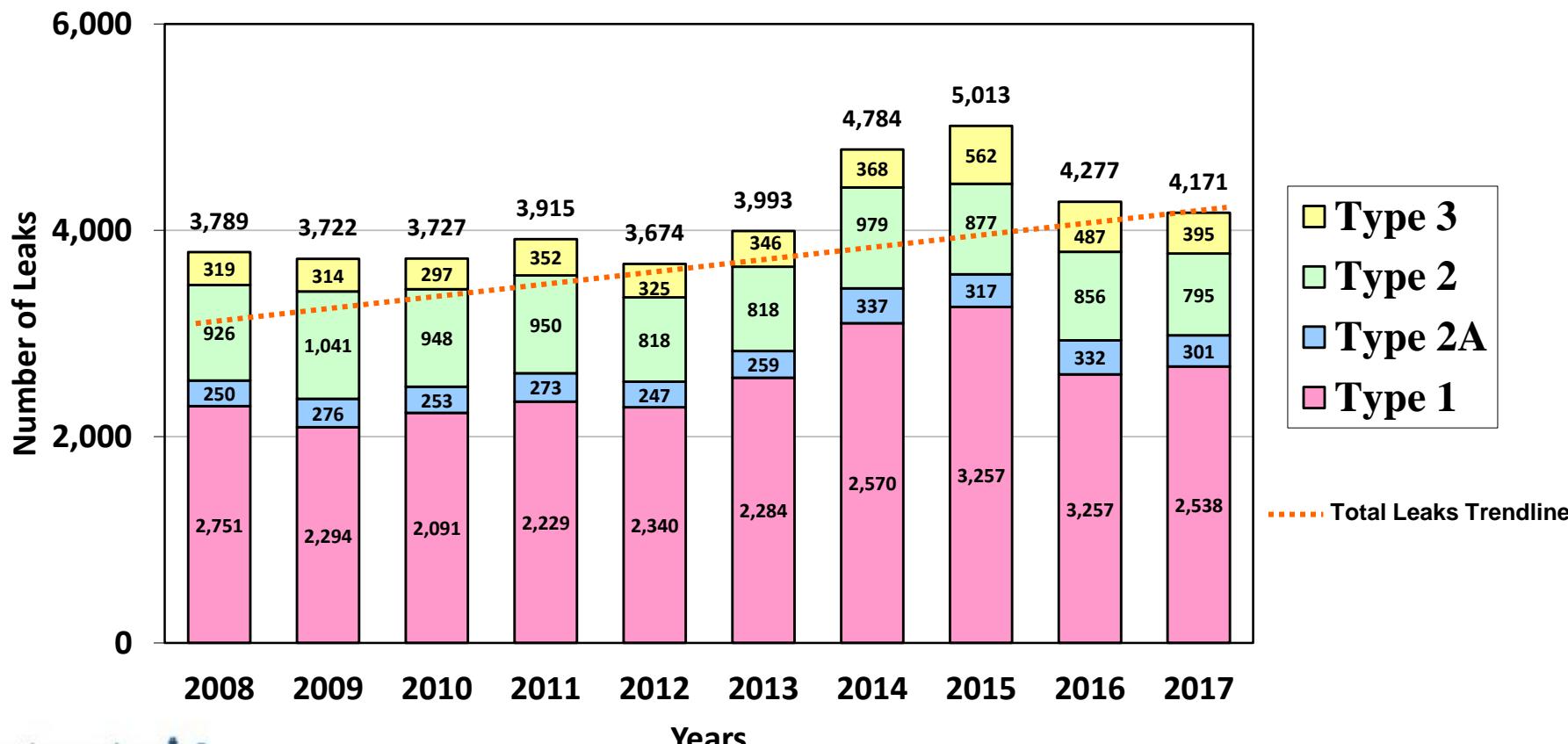
2017 SYSTEM INTEGRITY REPORT

NY State

LEAKS REPAIRED By REPAIRED Type

SERVICE

(Including Damages)



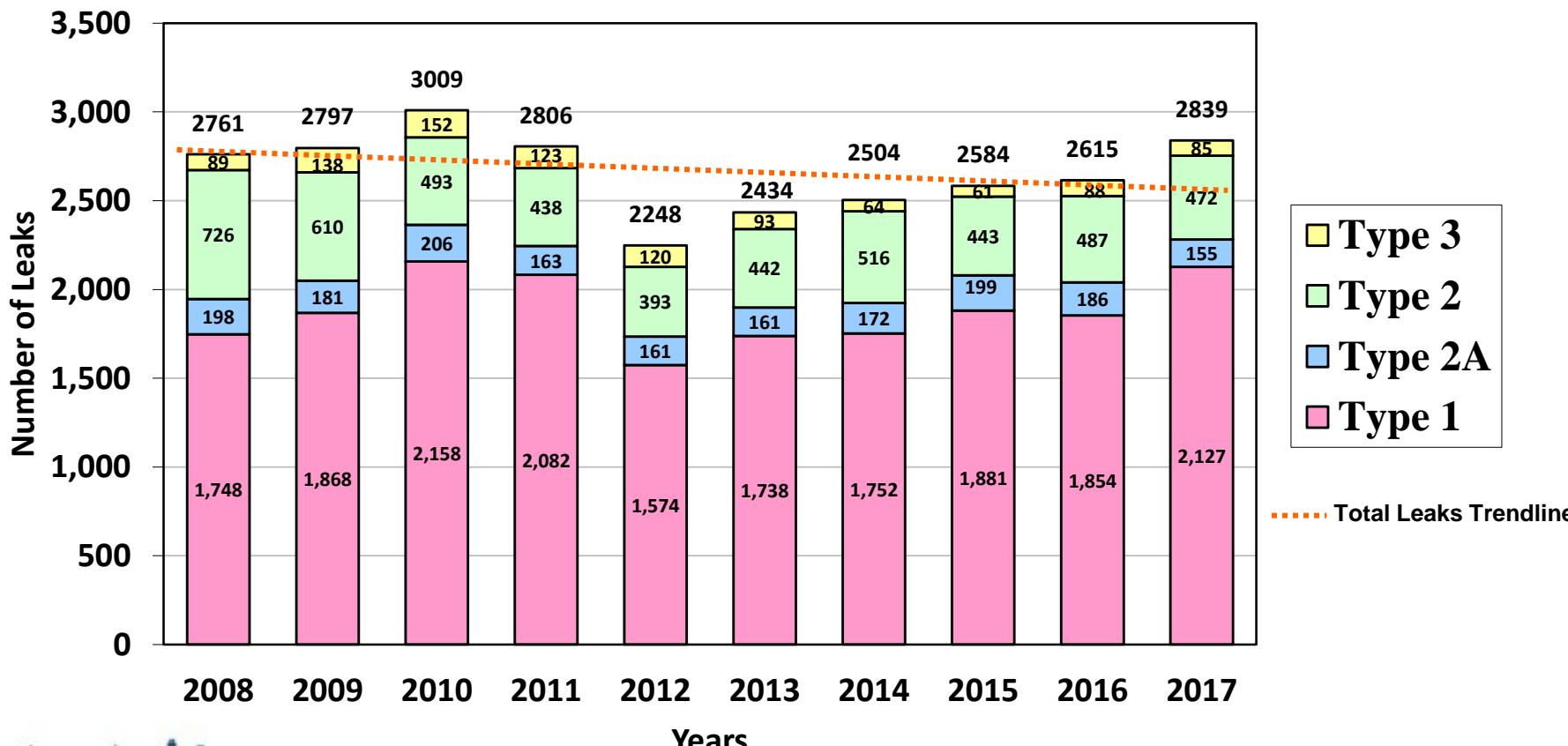
2017 SYSTEM INTEGRITY REPORT

BGC

LEAKS REPAIRED By REPAIRED Type

SERVICE

(Including Damages)



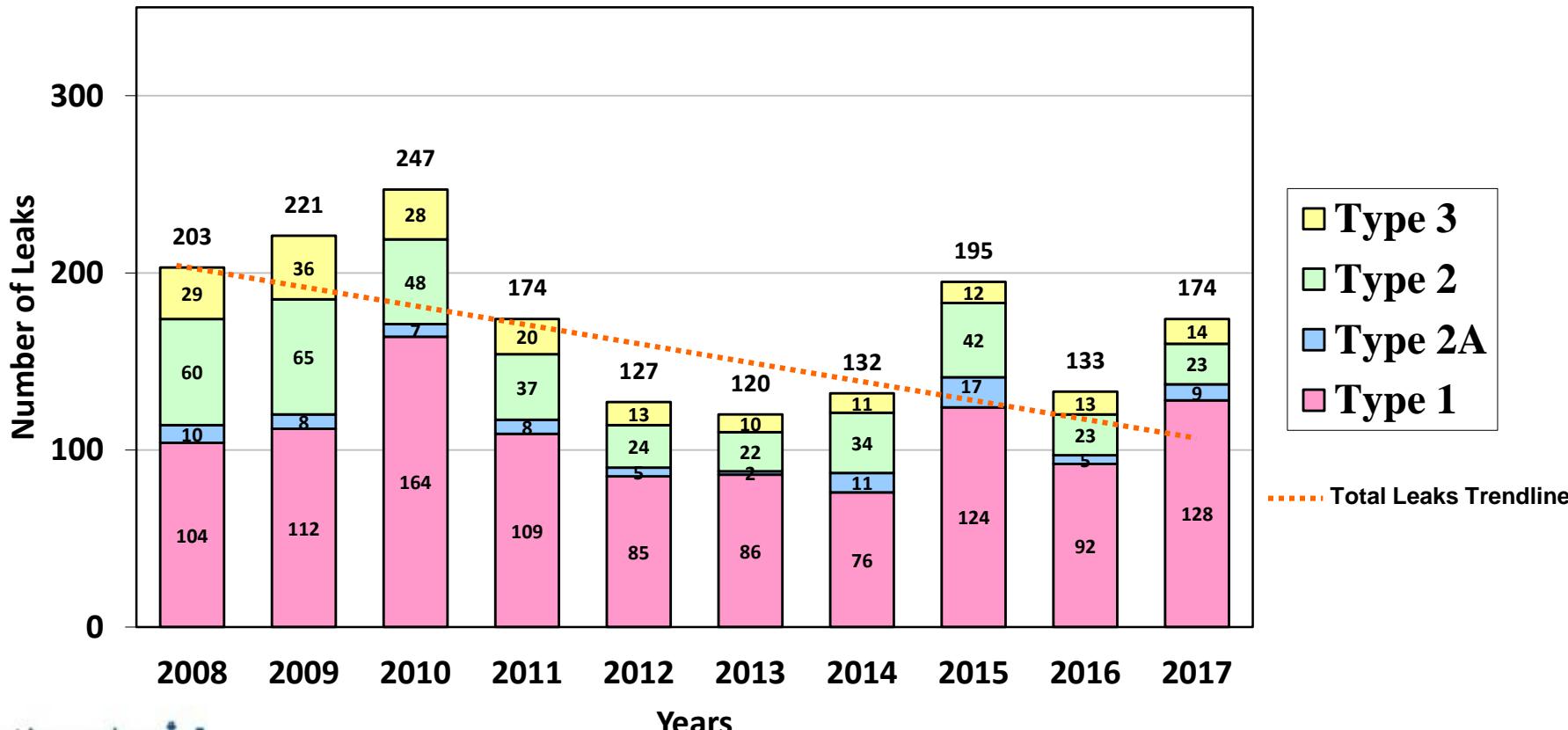
2017 SYSTEM INTEGRITY REPORT

EGC

LEAKS REPAIRED By REPAIRED Type

SERVICE

(Including Damages)



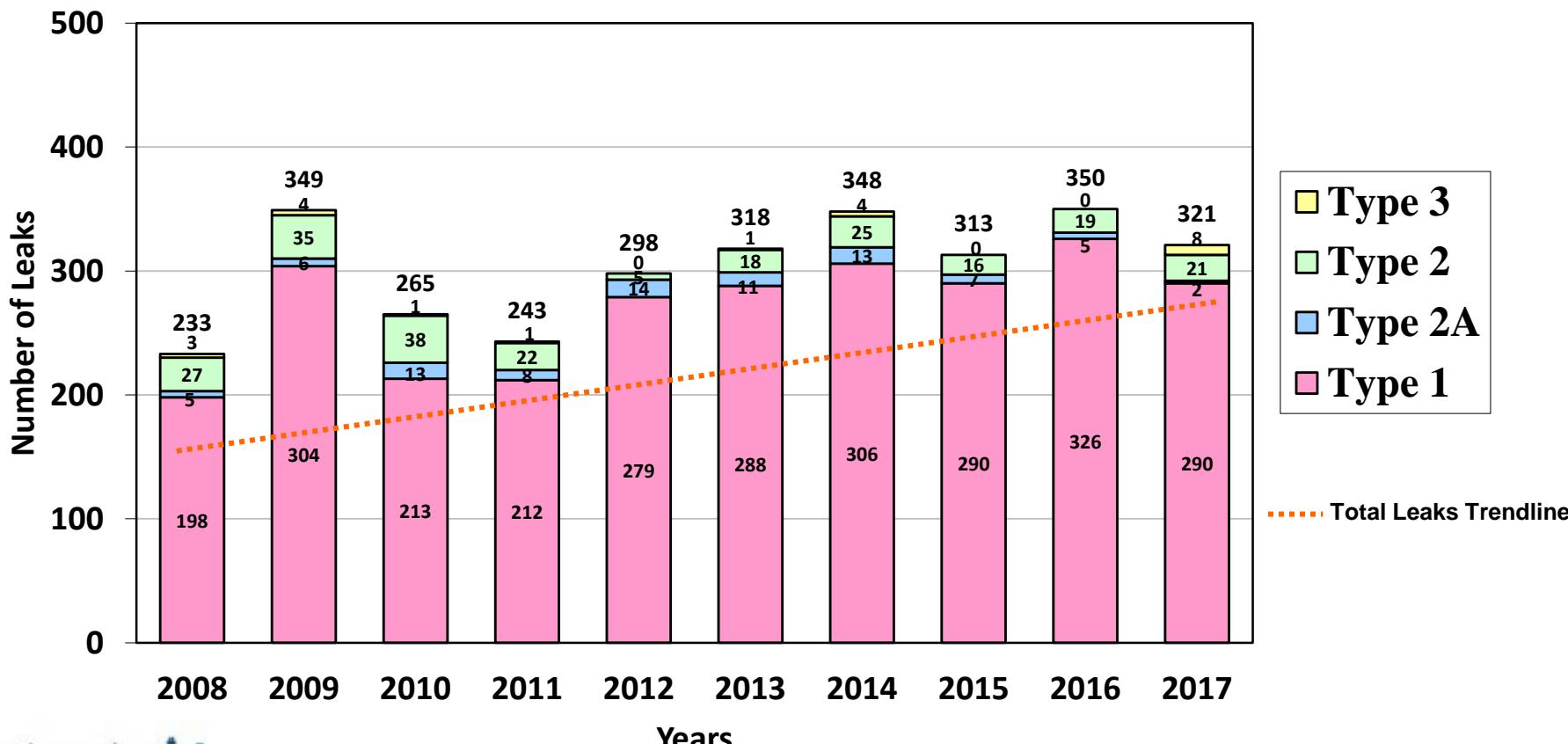
2017 SYSTEM INTEGRITY REPORT

CAPE

LEAKS REPAIRED By REPAIRED Type

SERVICE

(Including Damages)



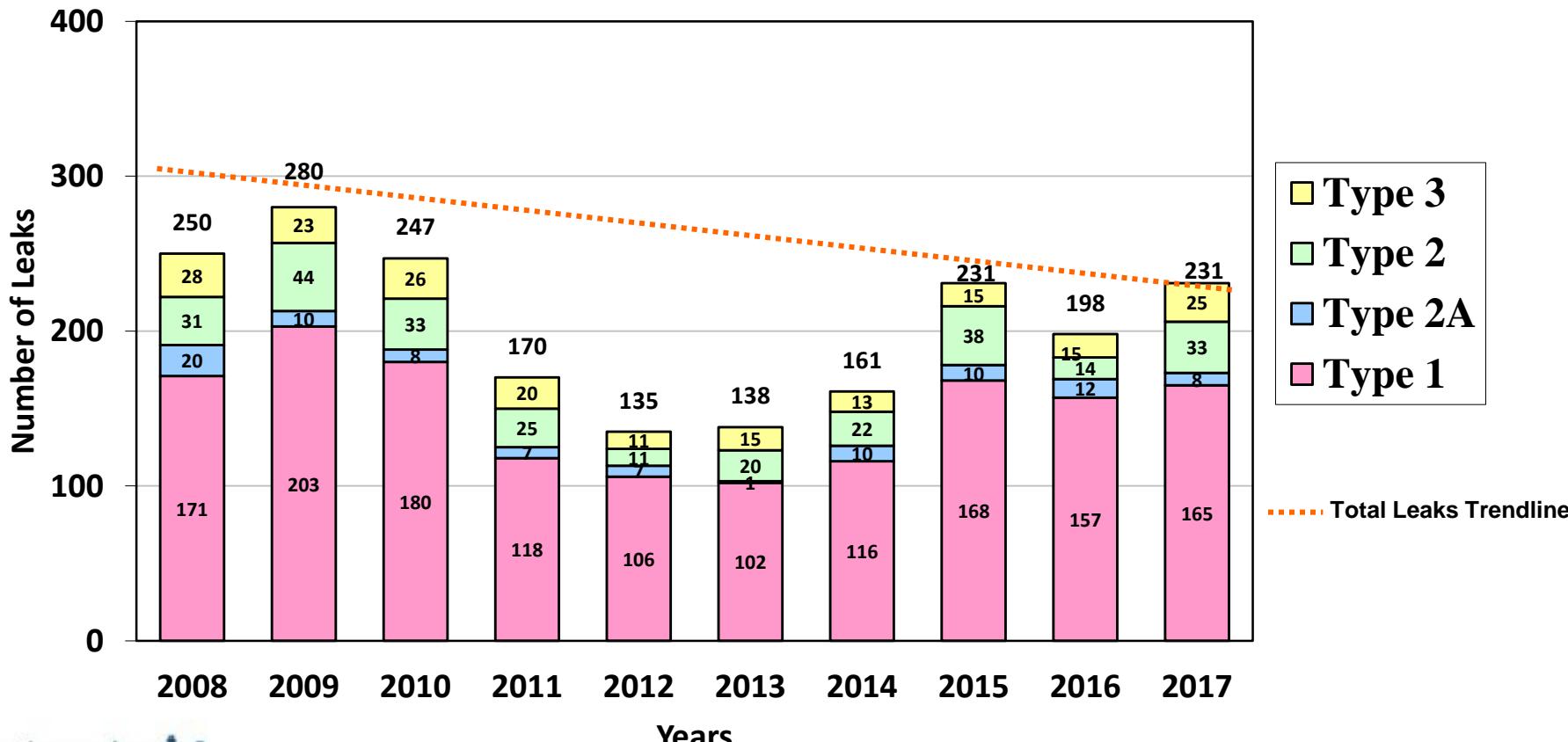
2017 SYSTEM INTEGRITY REPORT

LOWELL

LEAKS REPAIRED By REPAIRED Type

SERVICE

(Including Damages)



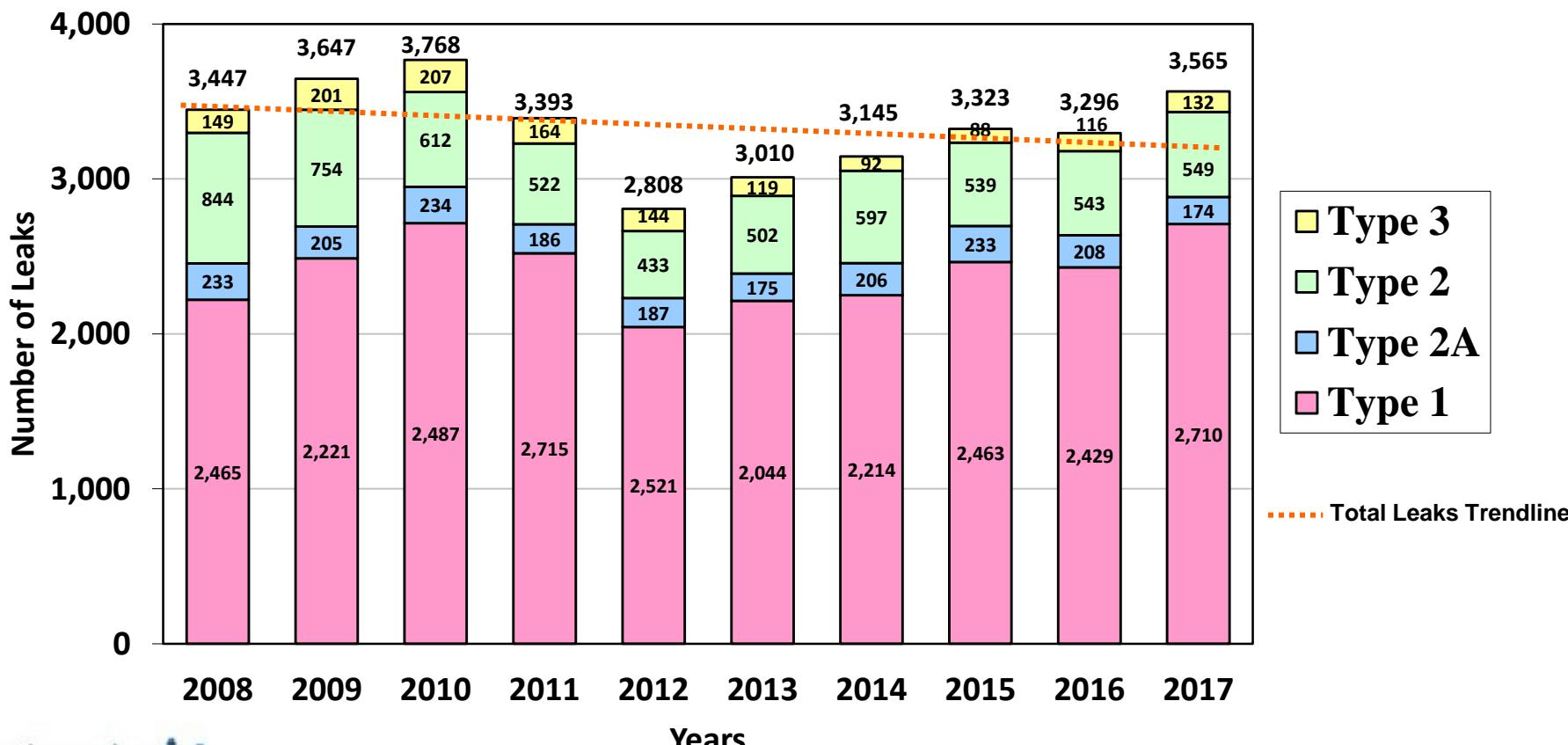
2017 SYSTEM INTEGRITY REPORT

MA

LEAKS REPAIRED By REPAIRED Type

SERVICE

(Including Damages)



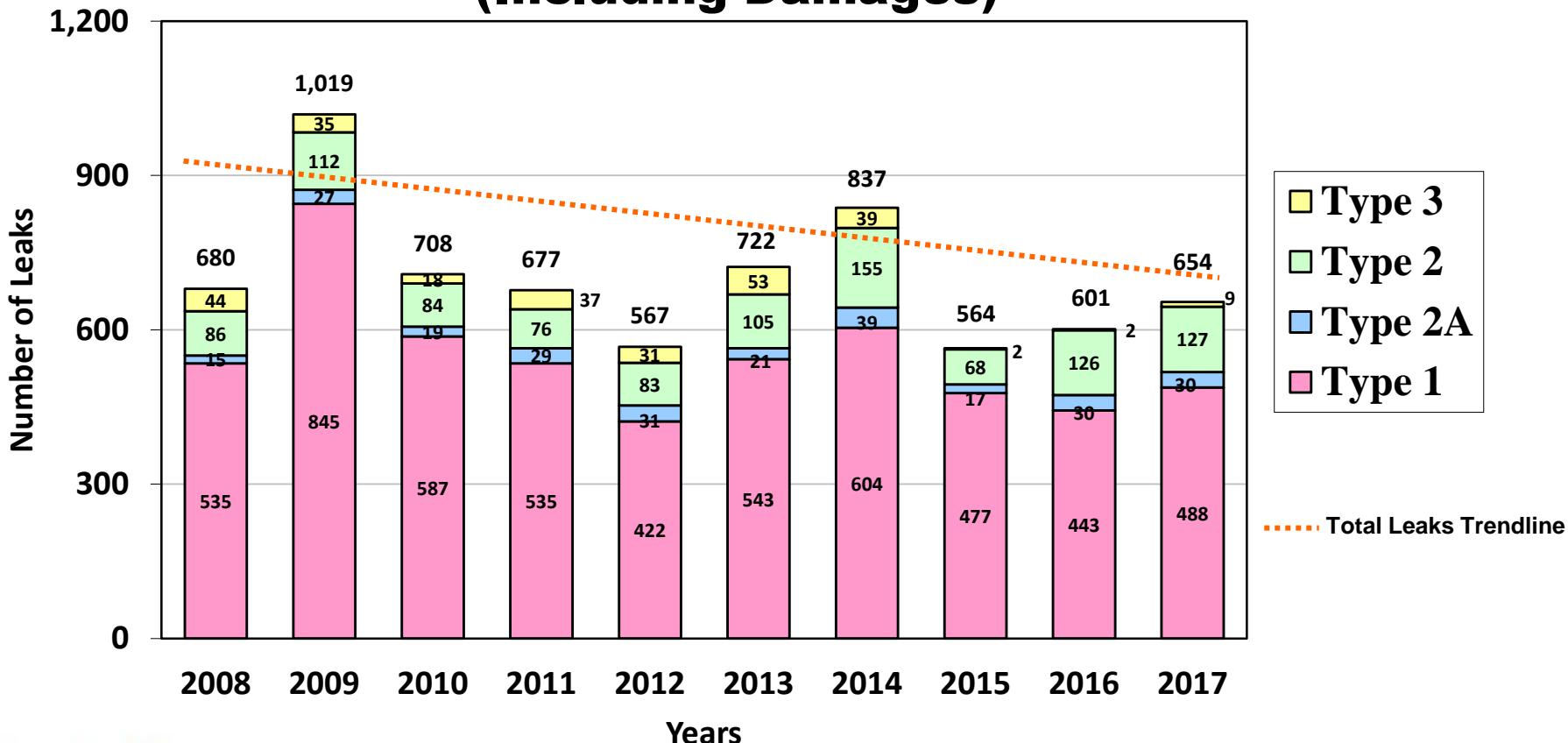
2017 SYSTEM INTEGRITY REPORT

RI

LEAKS REPAIRED By REPAIRED Type

SERVICE

(Including Damages)



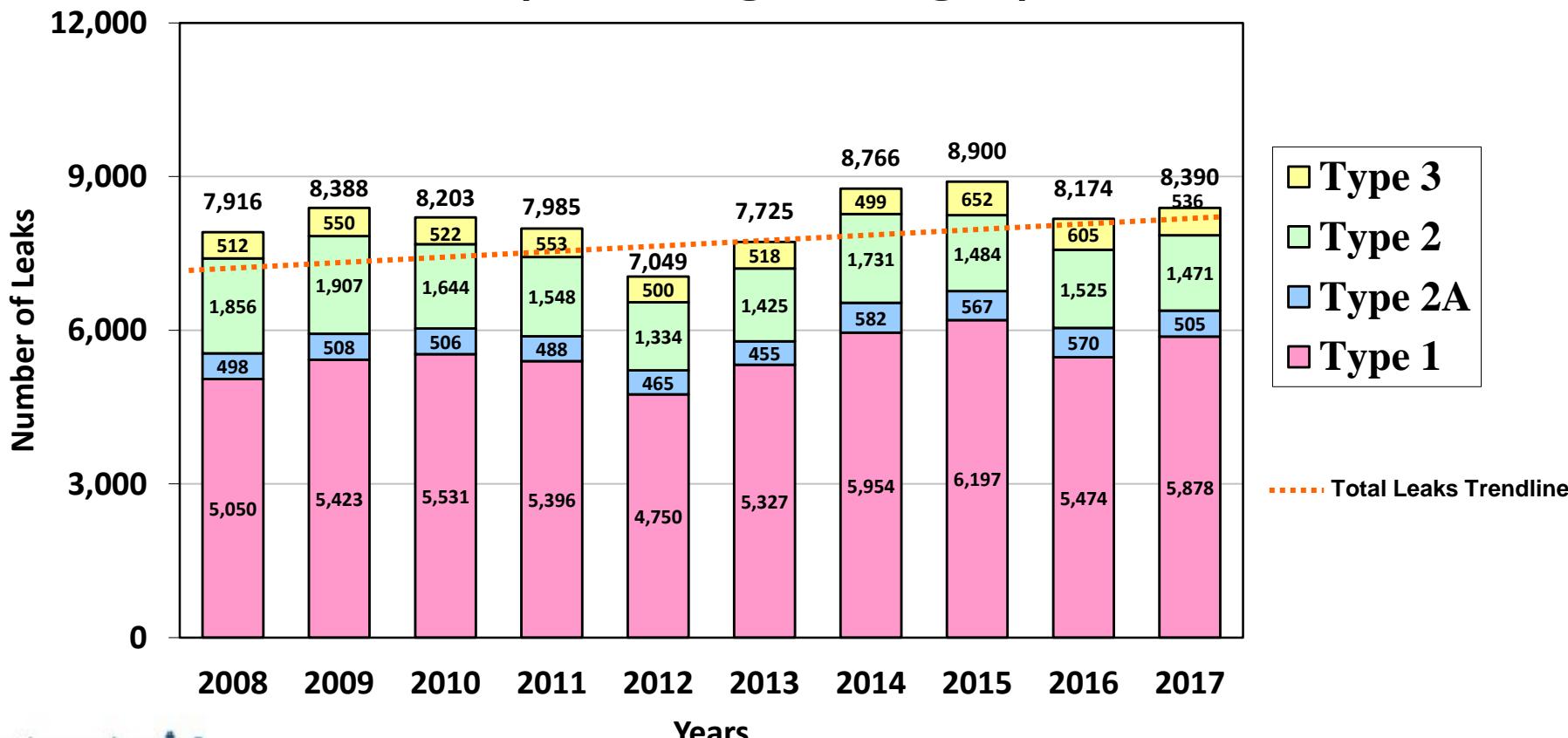
2017 SYSTEM INTEGRITY REPORT

US NGrid

LEAKS REPAIRED By REPAIRED Type

SERVICE

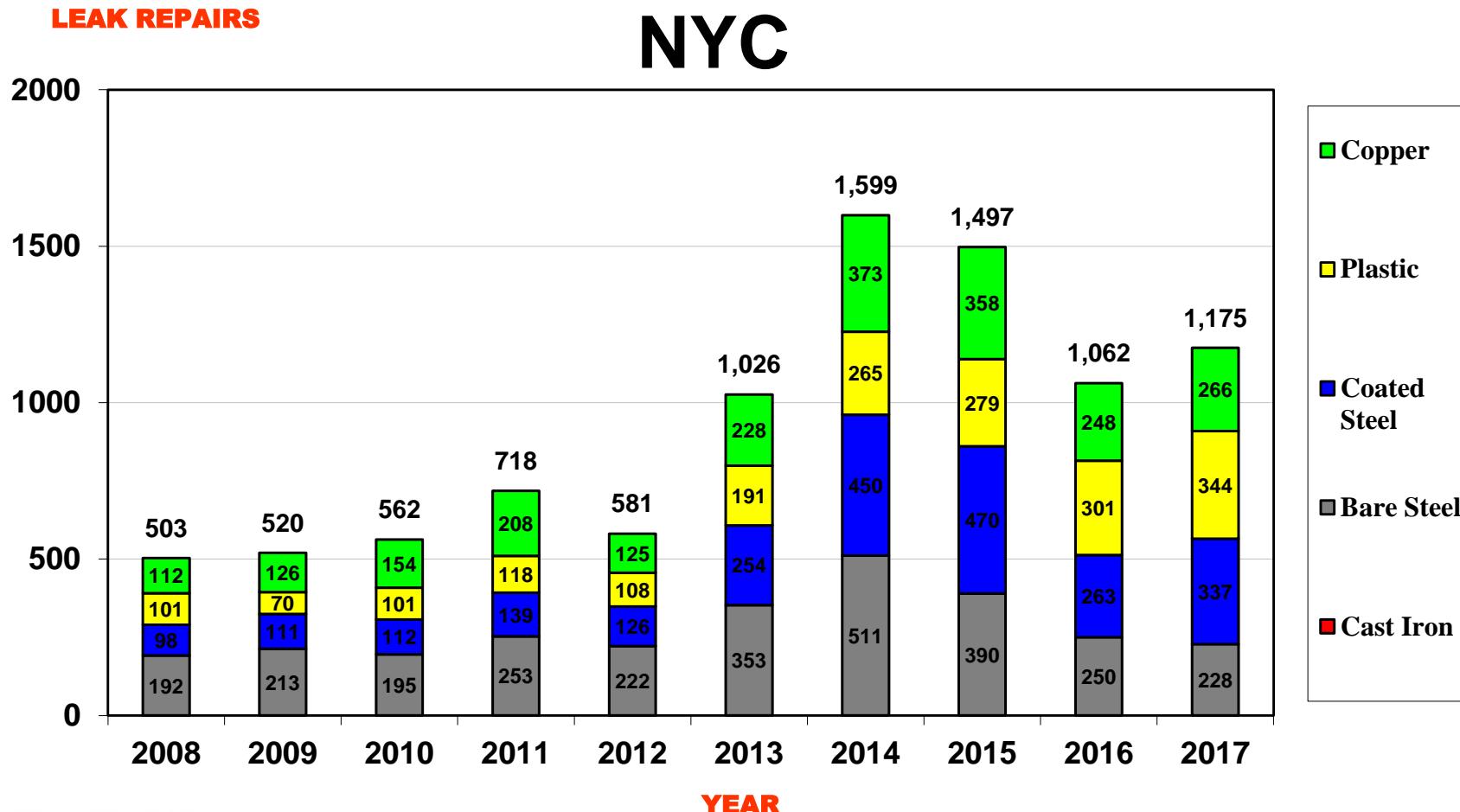
(Including Damages)



2017 SYSTEM INTEGRITY REPORT

2008 -2017 SERVICE LEAK REPAIRS

All Service Leak Repairs by Material
(Excluding Damages)

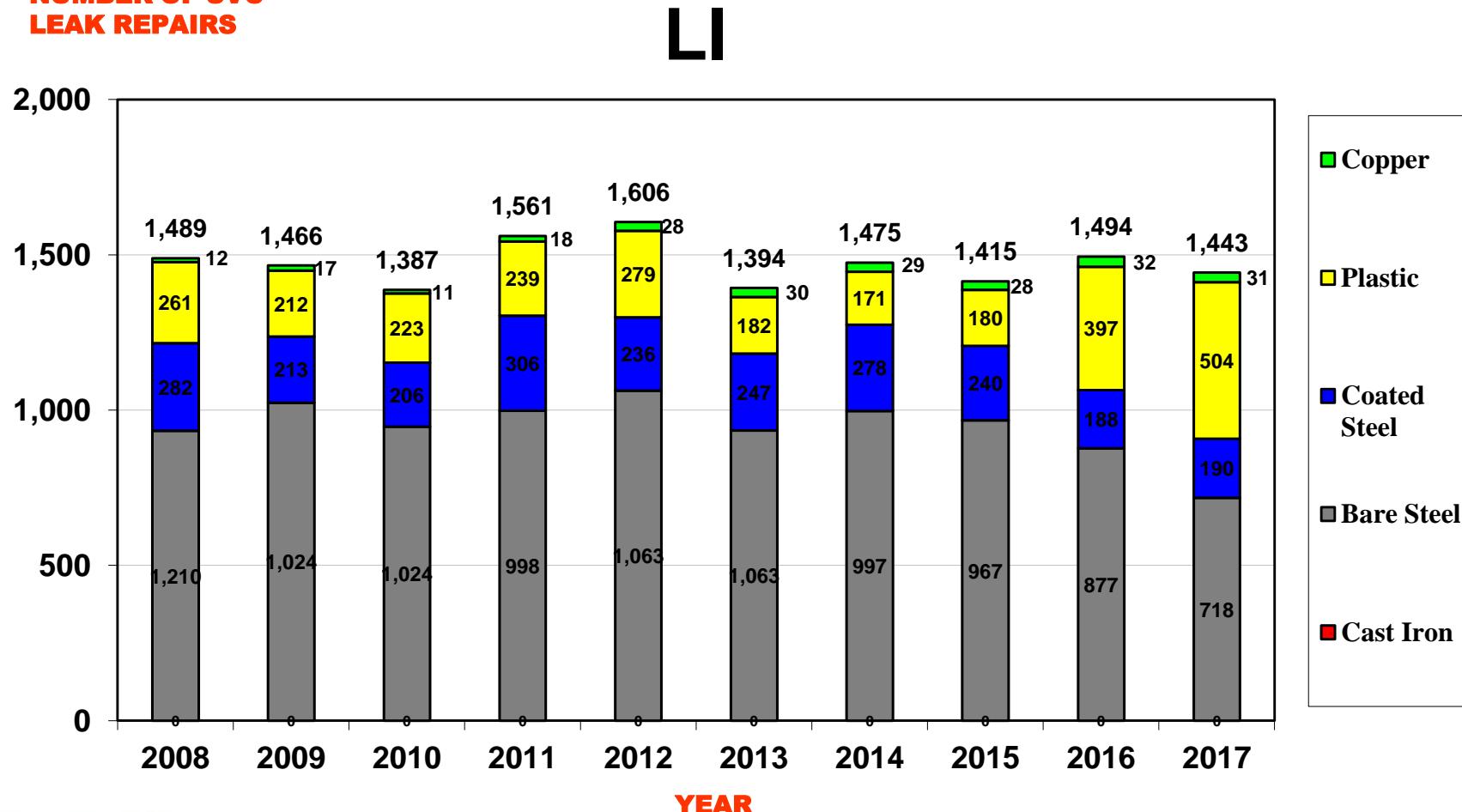


2017 SYSTEM INTEGRITY REPORT

2008 -2017 SERVICE LEAK REPAIRS

All Service Leak Repairs by Material (Excluding Damages)

**NUMBER OF SVC
LEAK REPAIRS**



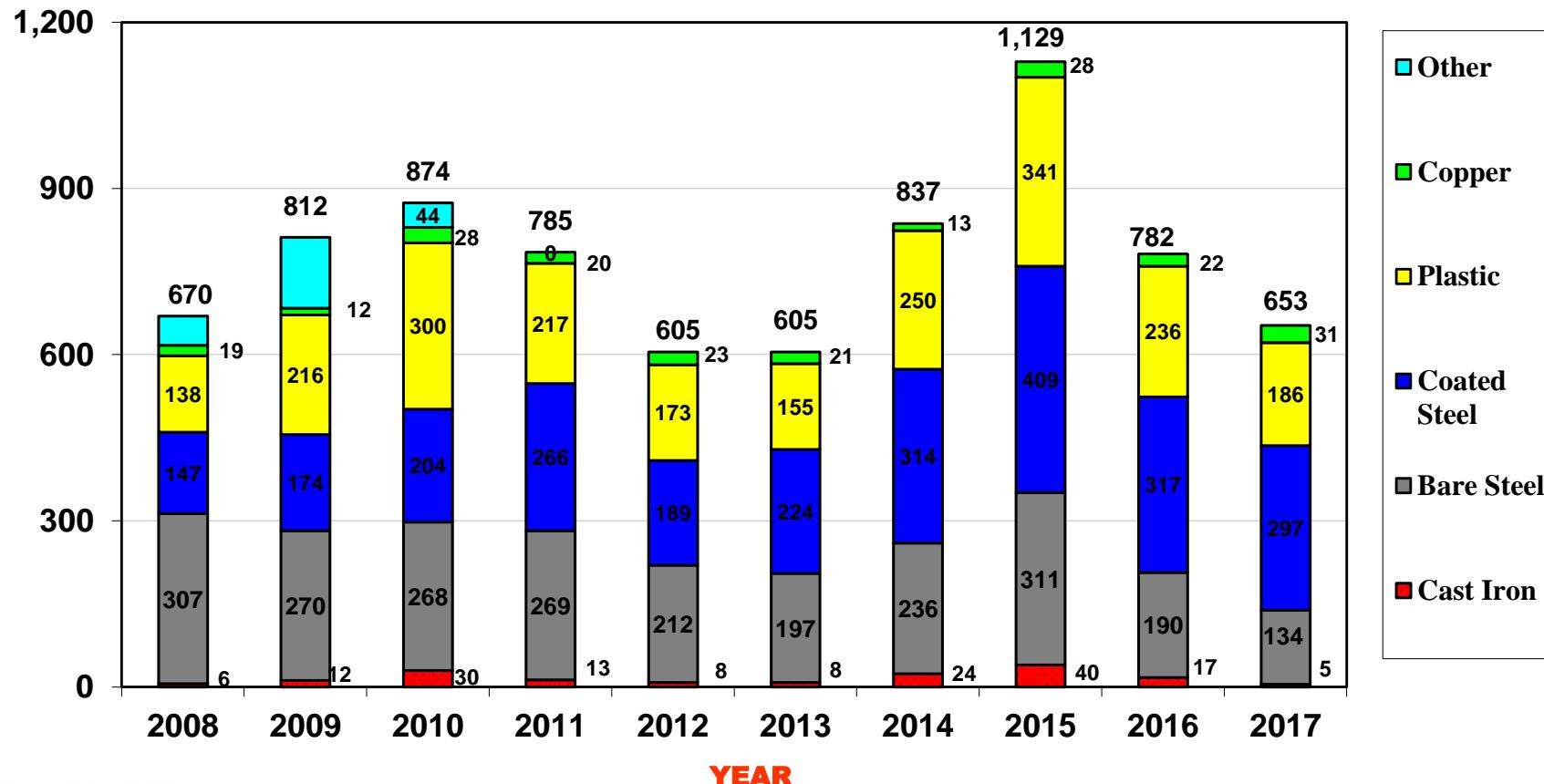
2017 SYSTEM INTEGRITY REPORT

2008 -2017 SERVICE LEAK REPAIRS

All Service Leak Repairs by Material
(Excluding Damages)

NUMBER OF SVC
LEAK REPAIRS

UPSTATE



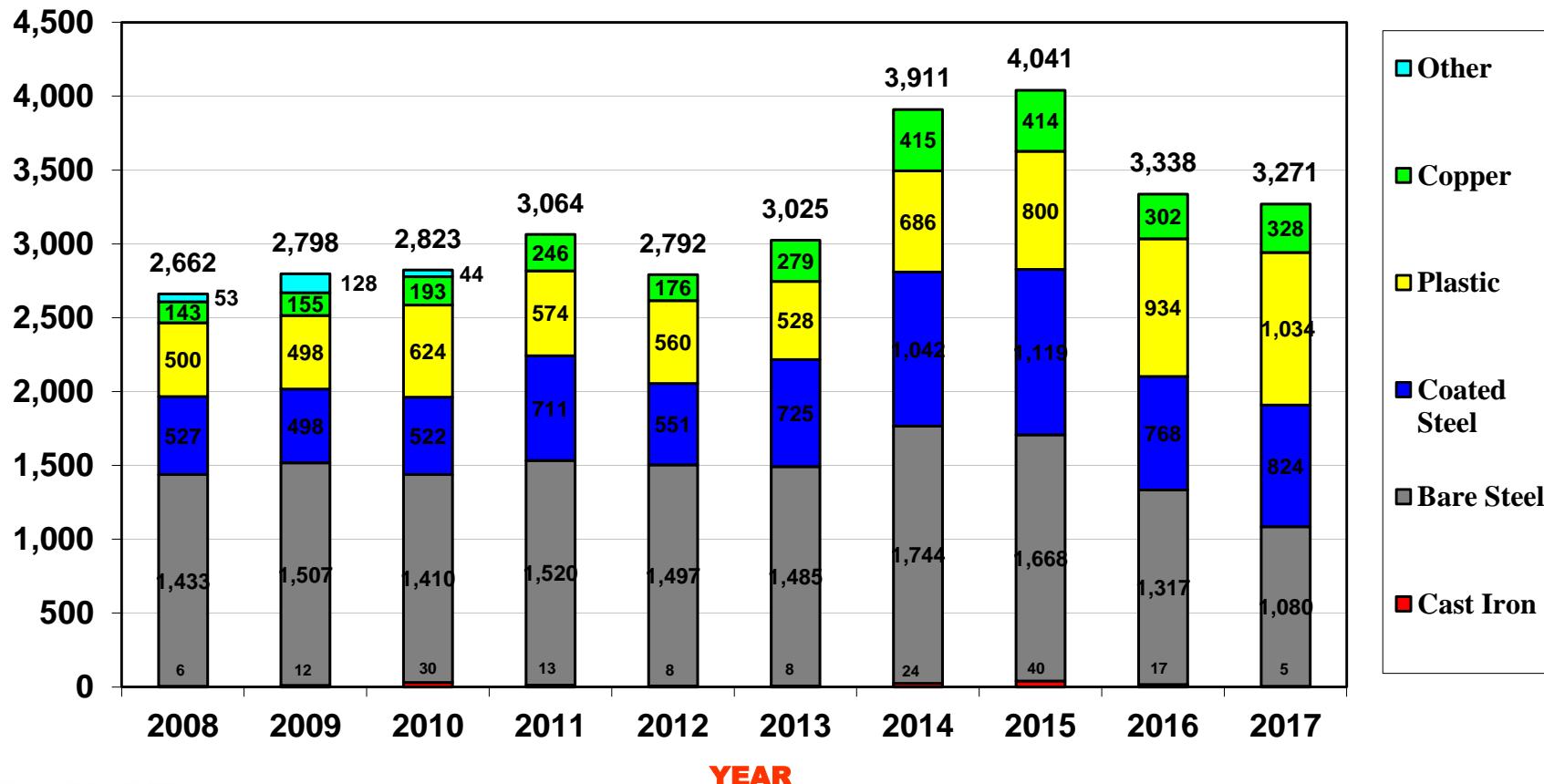
2017 SYSTEM INTEGRITY REPORT

2008 -2017 SERVICE LEAK REPAIRS

All Service Leak Repairs by Material
(Excluding Damages)

NUMBER OF SVC
LEAK REPAIRS

NY State



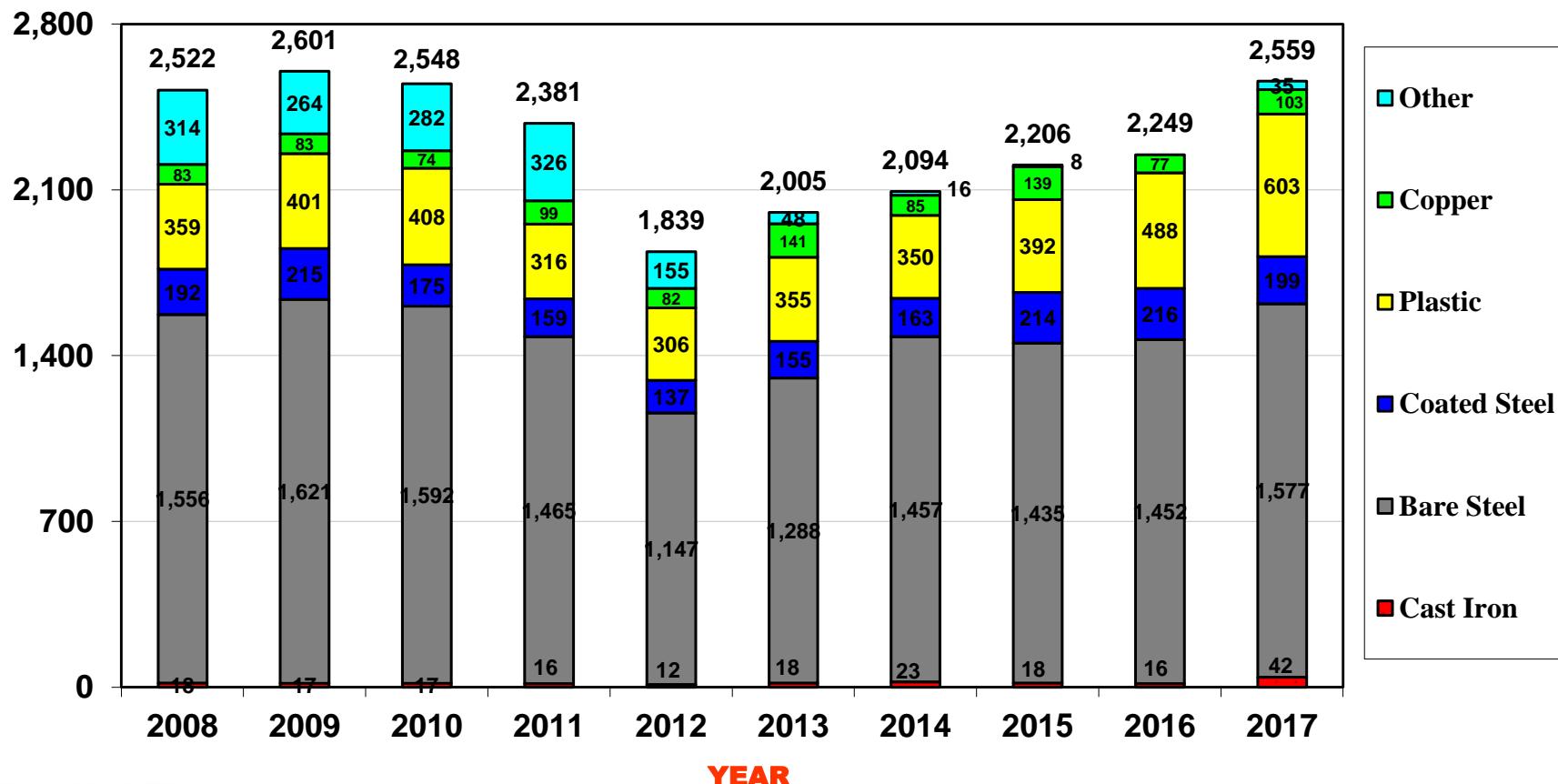
2017 SYSTEM INTEGRITY REPORT

2008 -2017 SERVICE LEAK REPAIRS

All Service Leak Repairs by Material
(Excluding Damages)

NUMBER OF SVC
LEAK REPAIRS

BGC



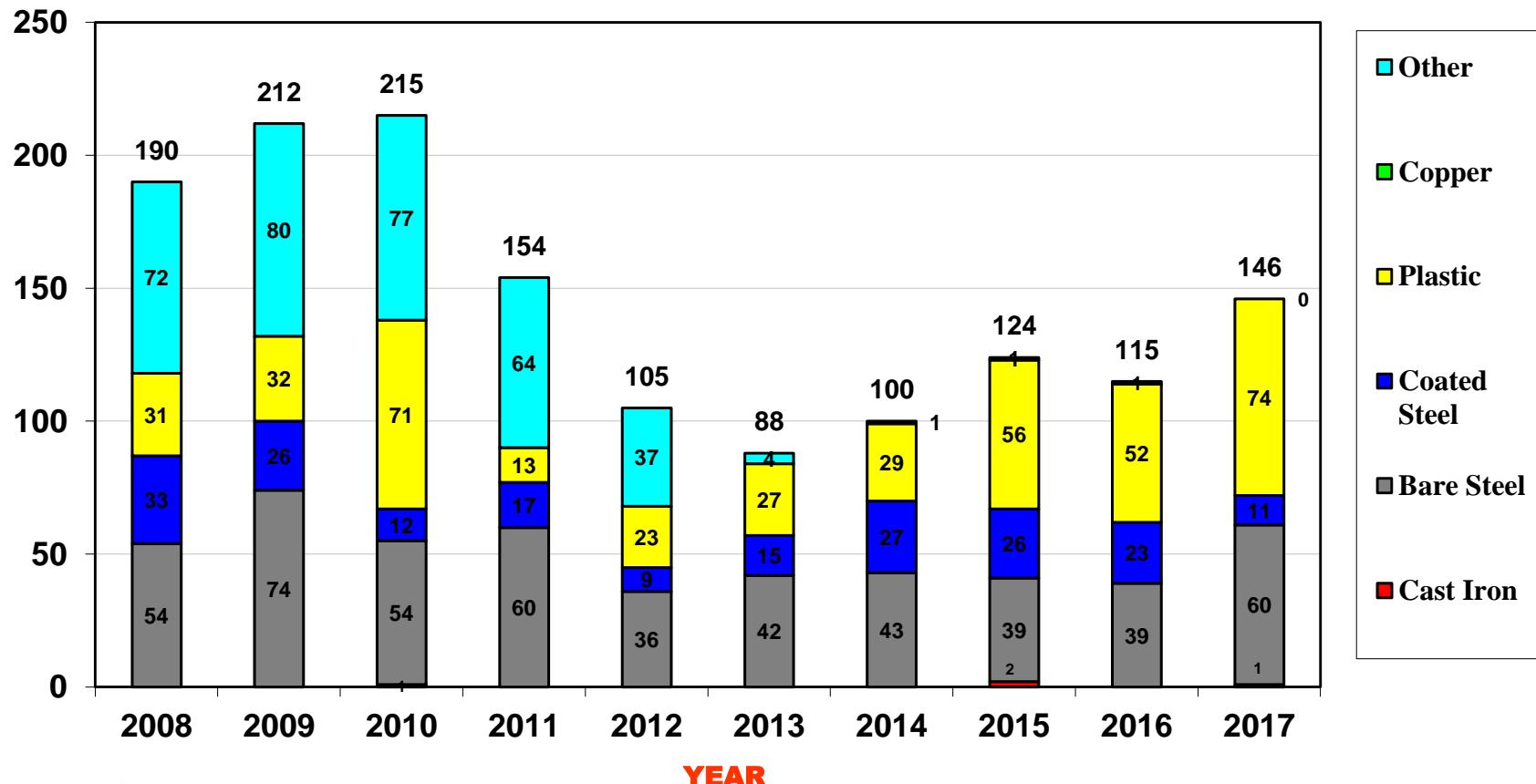
2017 SYSTEM INTEGRITY REPORT

2008 -2017 SERVICE LEAK REPAIRS

All Service Leak Repairs by Material
(Excluding Damages)

NUMBER OF SVC
LEAK REPAIRS

EGC



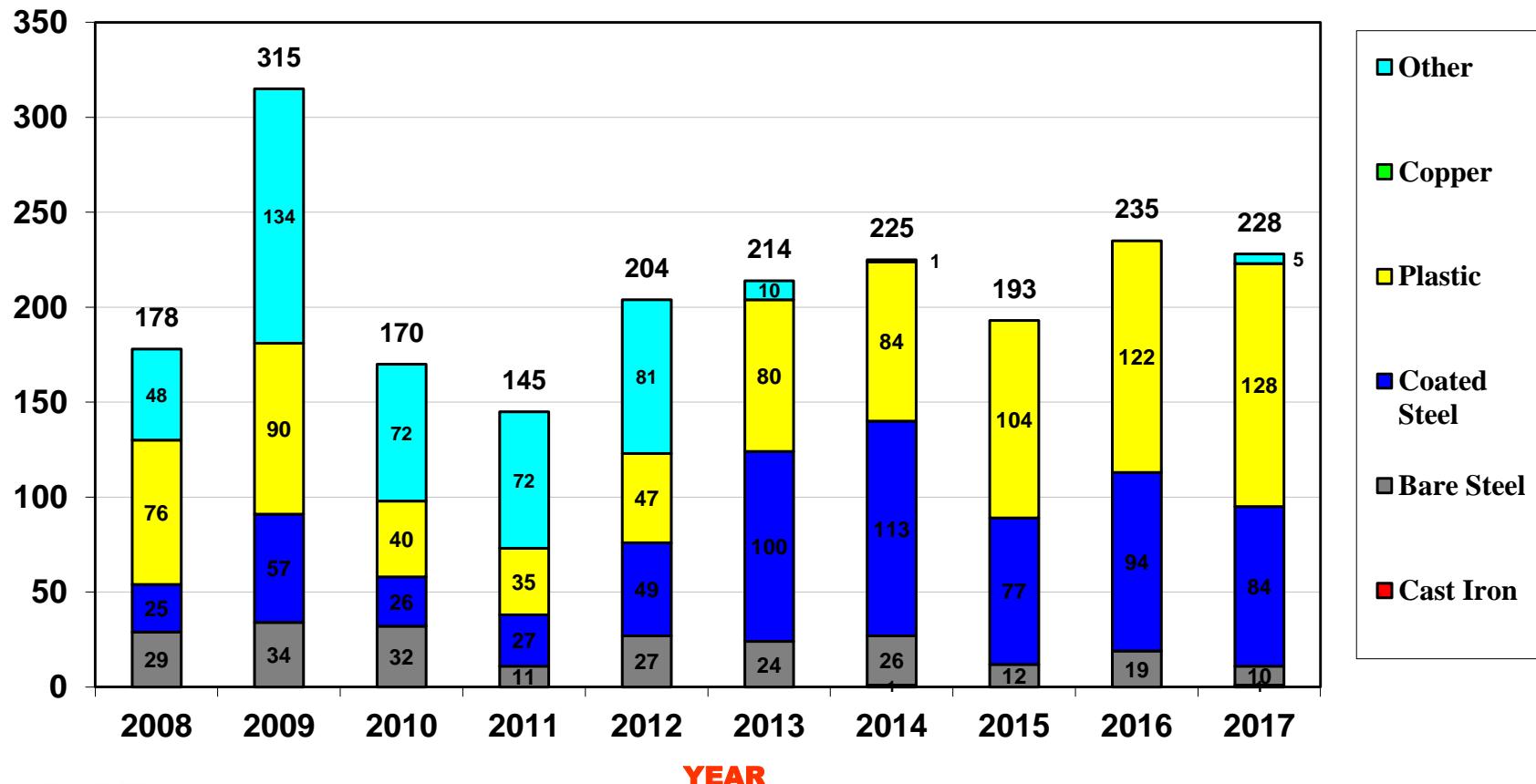
2017 SYSTEM INTEGRITY REPORT

2008 -2017 SERVICE LEAK REPAIRS

All Service Leak Repairs by Material
(Excluding Damages)

NUMBER OF SVC
LEAK REPAIRS

CAPE



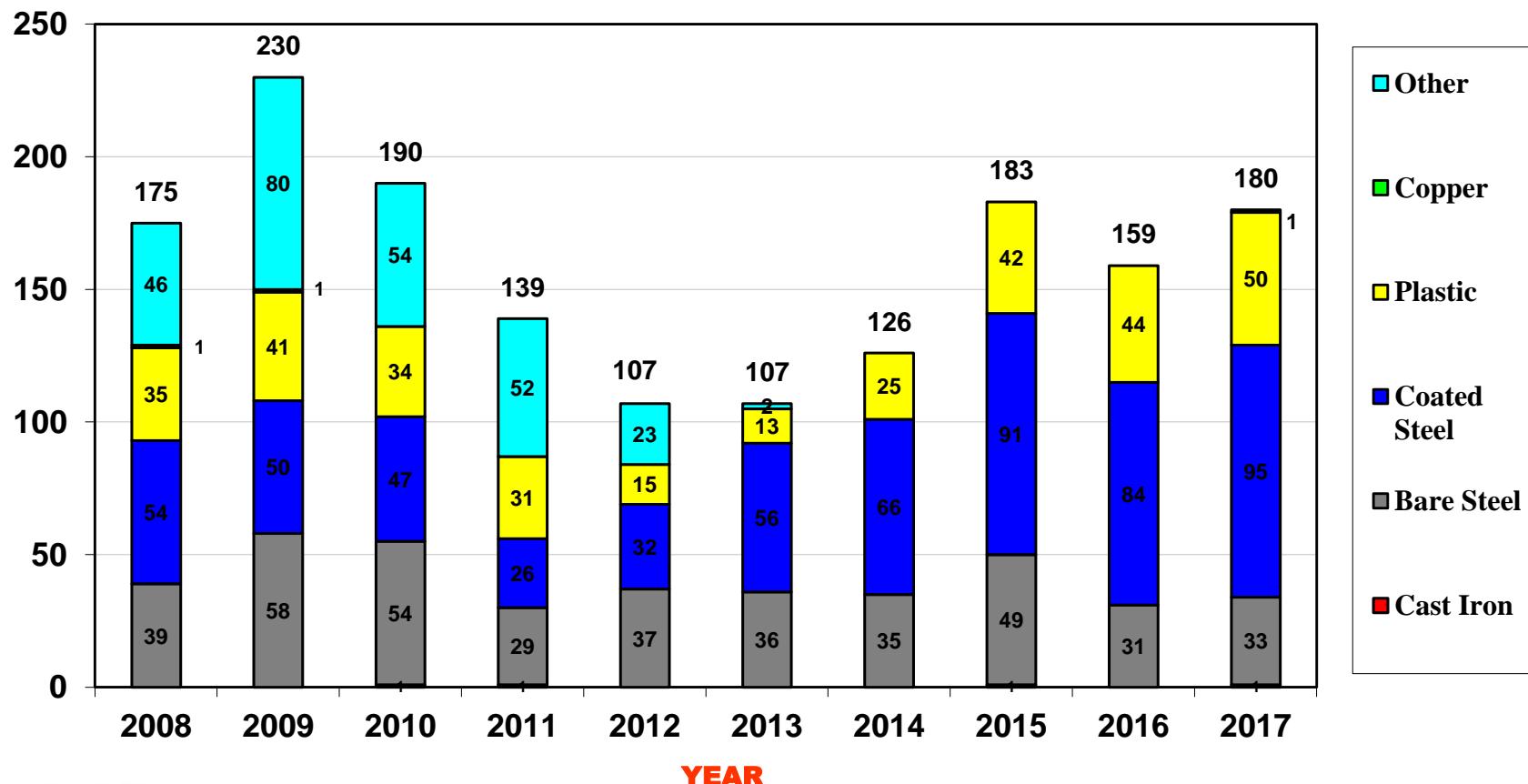
2017 SYSTEM INTEGRITY REPORT

2008 -2017 SERVICE LEAK REPAIRS

All Service Leak Repairs by Material
(Excluding Damages)

NUMBER OF SVC
LEAK REPAIRS

LOWELL

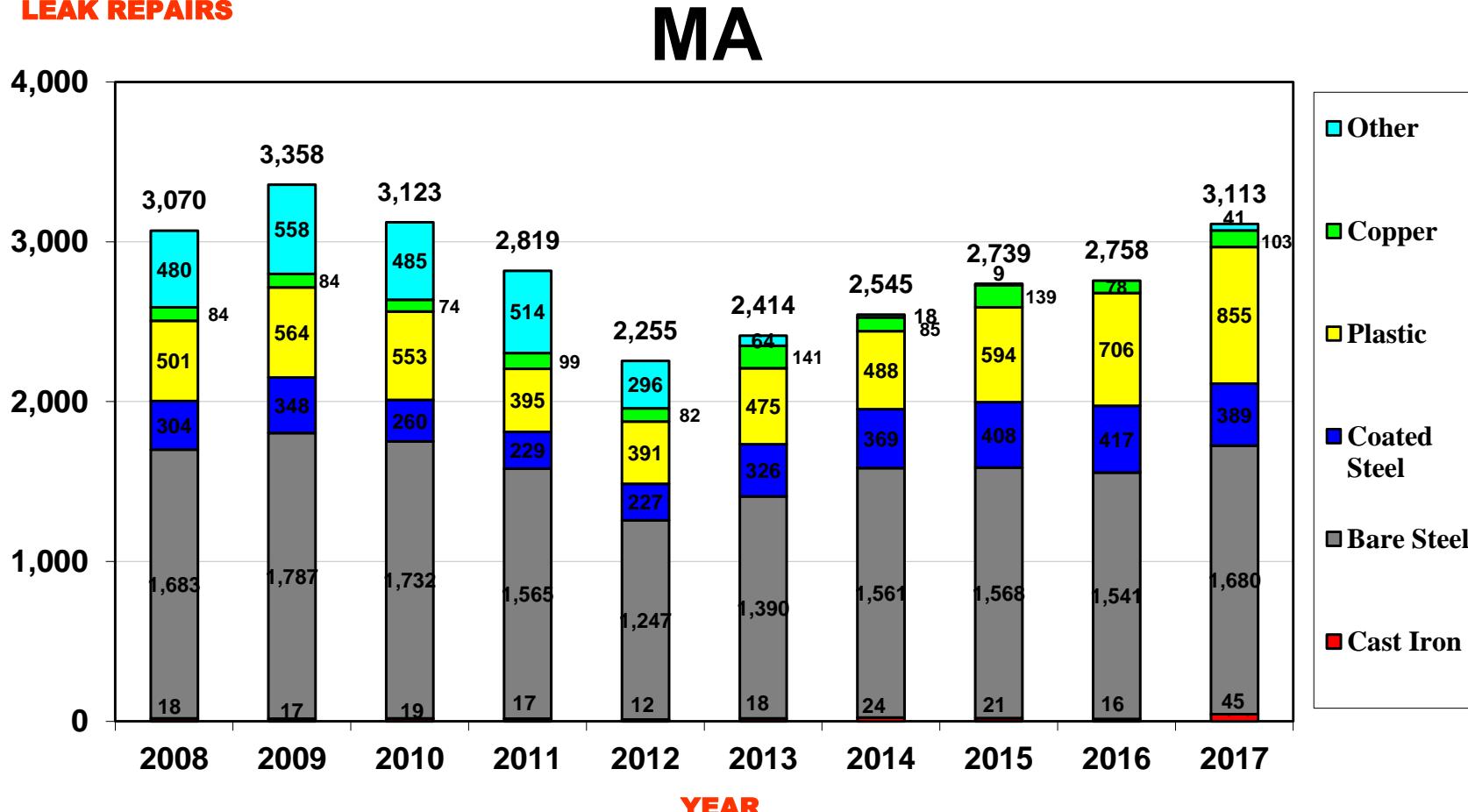


2017 SYSTEM INTEGRITY REPORT

2008 -2017 SERVICE LEAK REPAIRS

All Service Leak Repairs by Material (Excluding Damages)

**NUMBER OF SVC
LEAK REPAIRS**



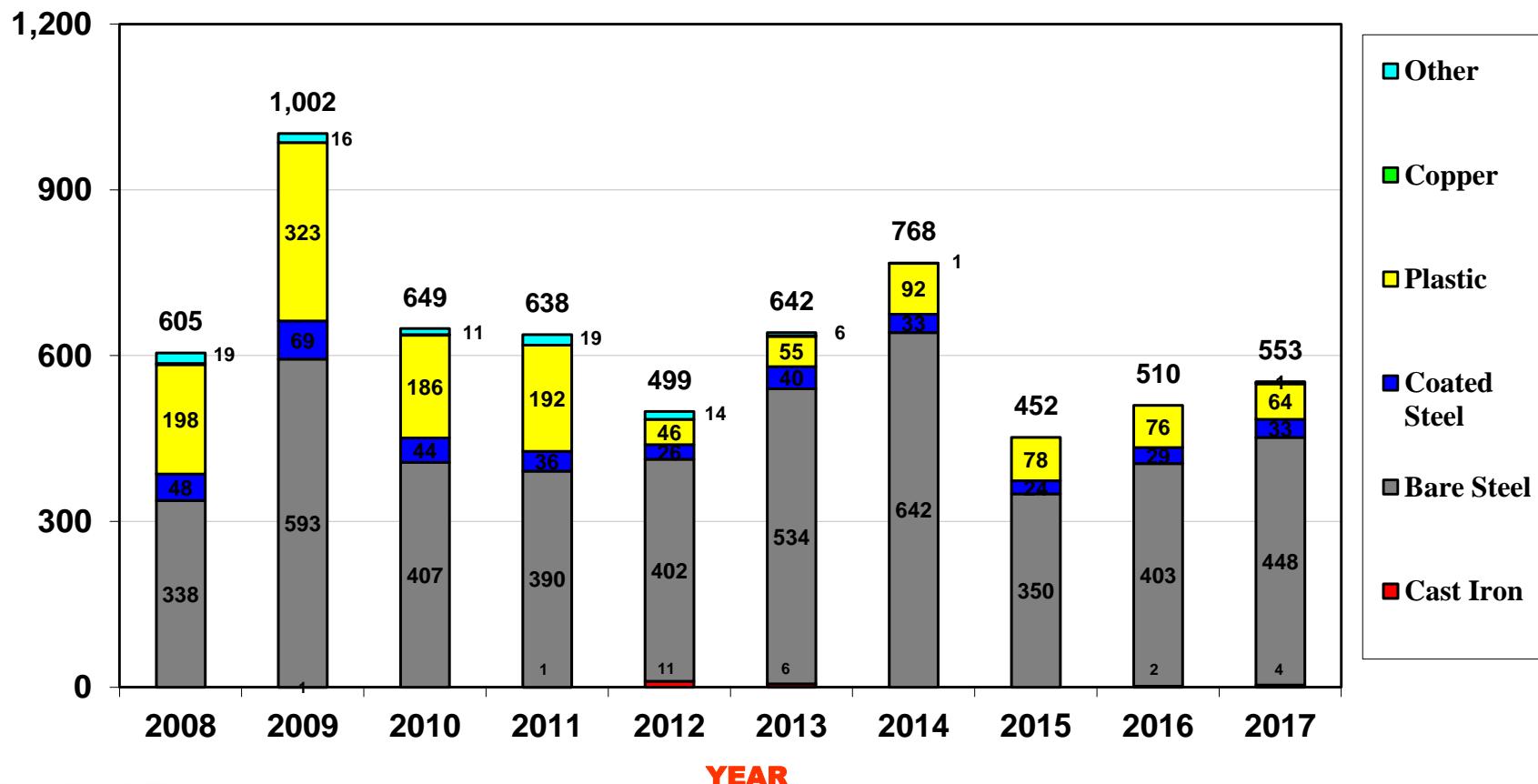
2017 SYSTEM INTEGRITY REPORT

2008 -2017 SERVICE LEAK REPAIRS

All Service Leak Repairs by Material (Excluding Damages)

**NUMBER OF SVC
LEAK REPAIRS**

RI



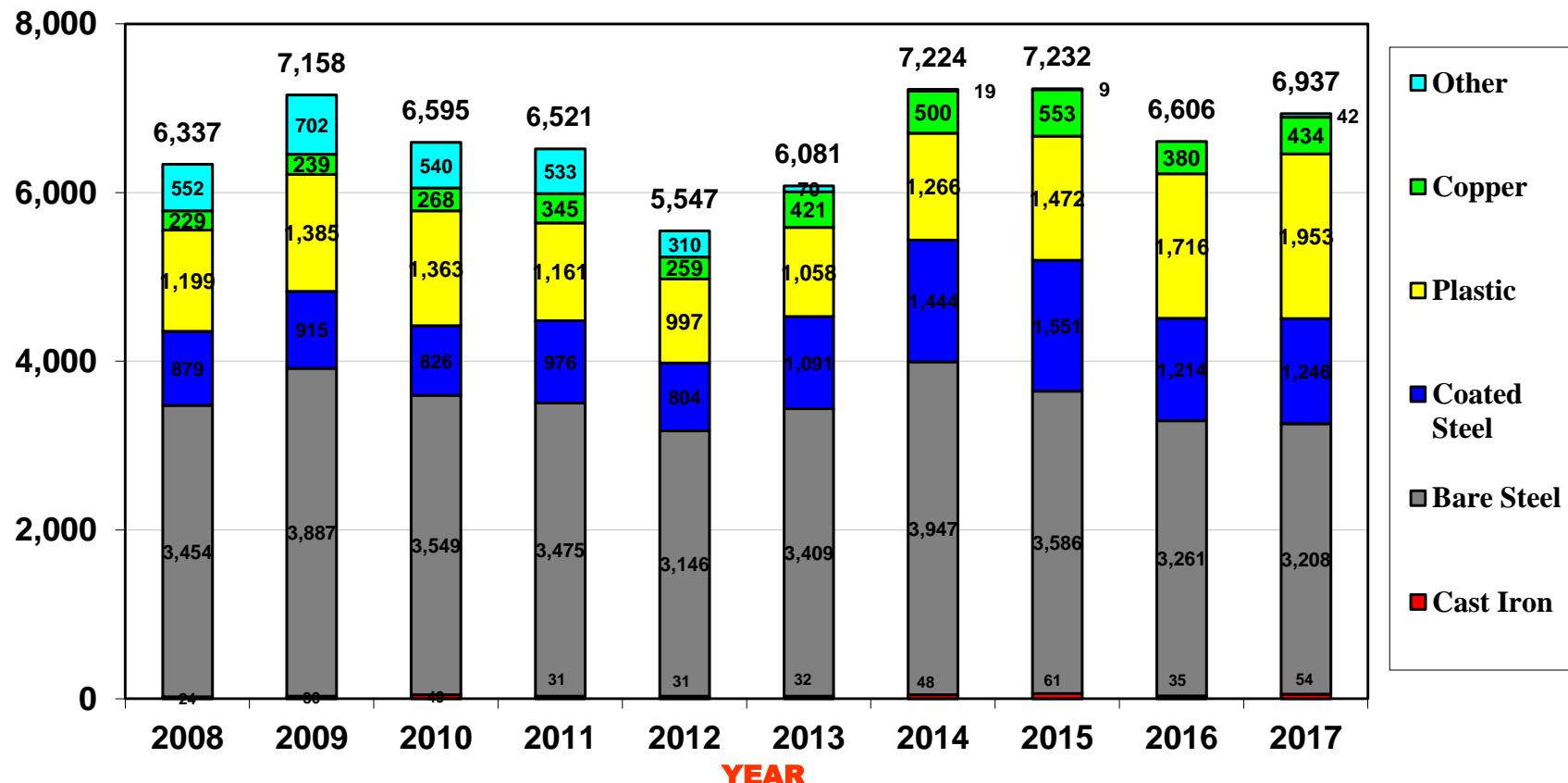
2017 SYSTEM INTEGRITY REPORT

2008 -2017 SERVICE LEAK REPAIRS

All Service Leak Repairs by Material (Excluding Damages)

**NUMBER OF SVC
LEAK REPAIRS**

US NGrid

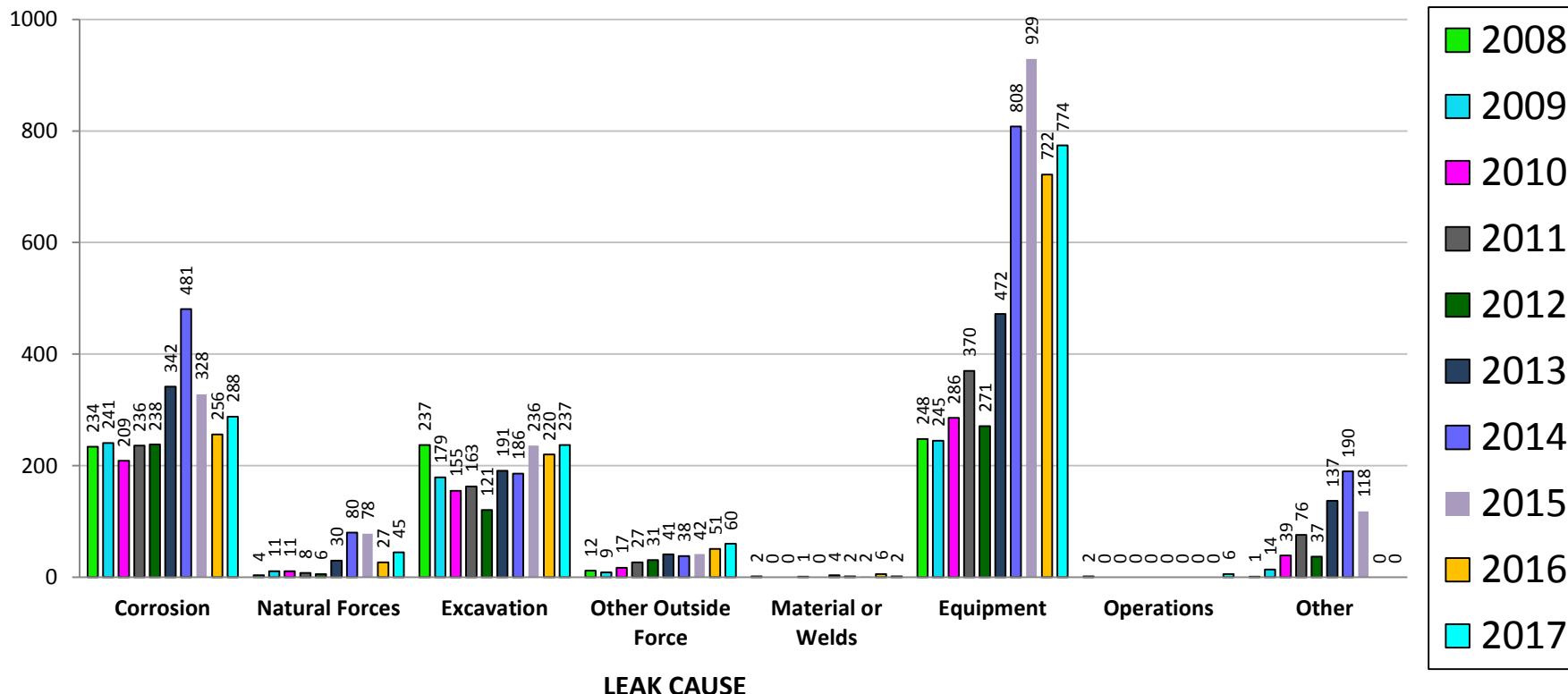


2017 SYSTEM INTEGRITY REPORT

NYC

SERVICE LEAKS REPAIRED COMPARISON BY LEAK CAUSES

LEAK REPAIRS

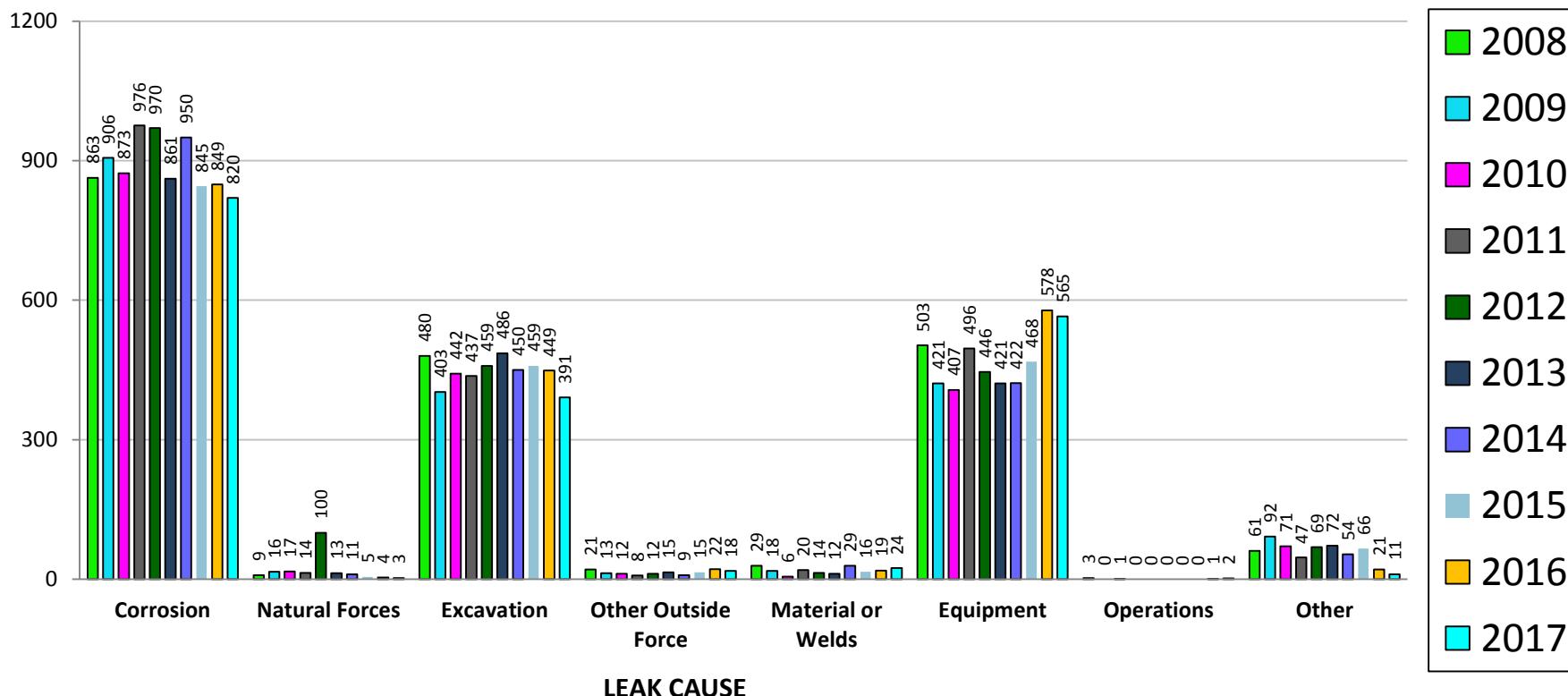


2017 SYSTEM INTEGRITY REPORT



SERVICE LEAKS REPAIRED COMPARISON BY LEAK CAUSES

LEAK REPAIRS

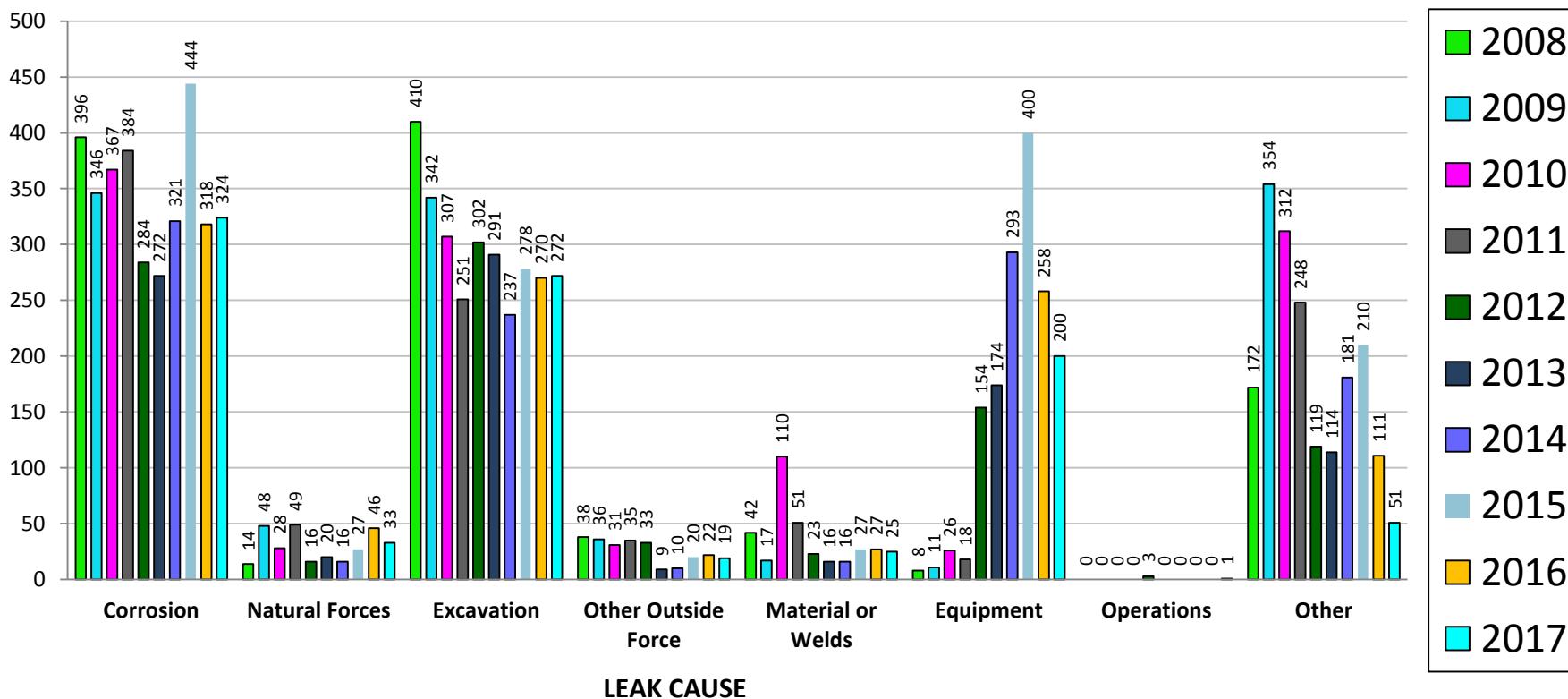


2017 SYSTEM INTEGRITY REPORT

UPSTATE

SERVICE LEAKS REPAIRED COMPARISON BY LEAK CAUSES

LEAK REPAIRS

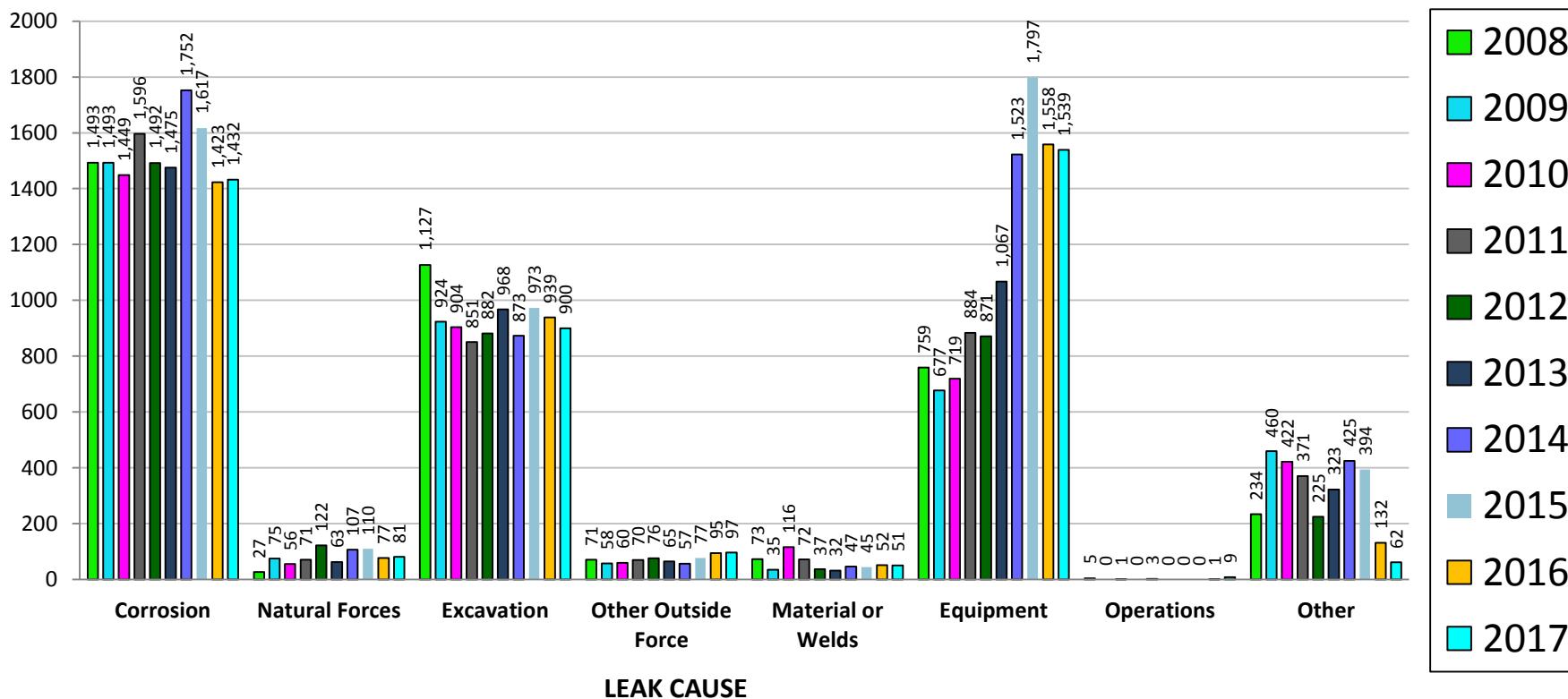


2017 SYSTEM INTEGRITY REPORT

NY-STATE

SERVICE LEAKS REPAIRED COMPARISON BY LEAK CAUSES

LEAK REPAIRS

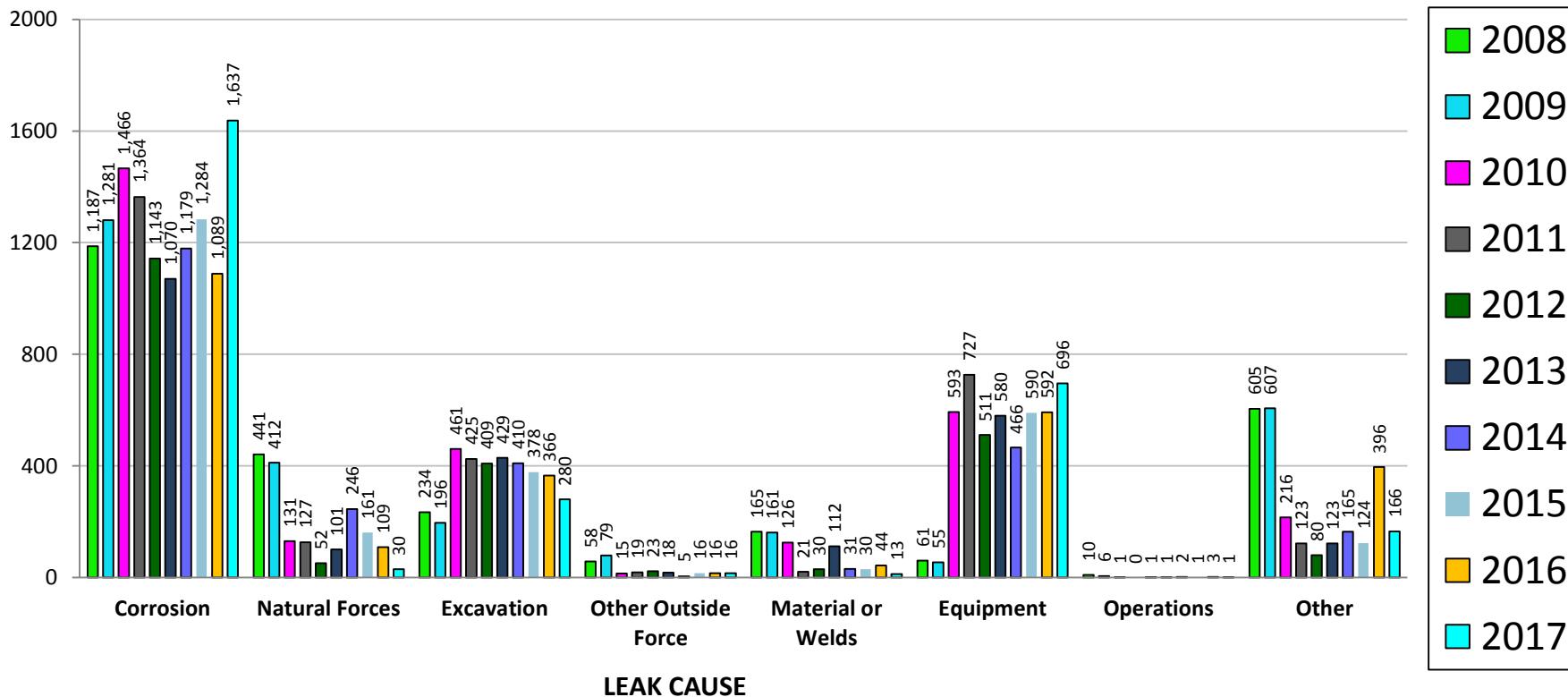


2017 SYSTEM INTEGRITY REPORT

BGC

SERVICE LEAKS REPAIRED *COMPARISON BY LEAK CAUSES*

LEAK REPAIRS

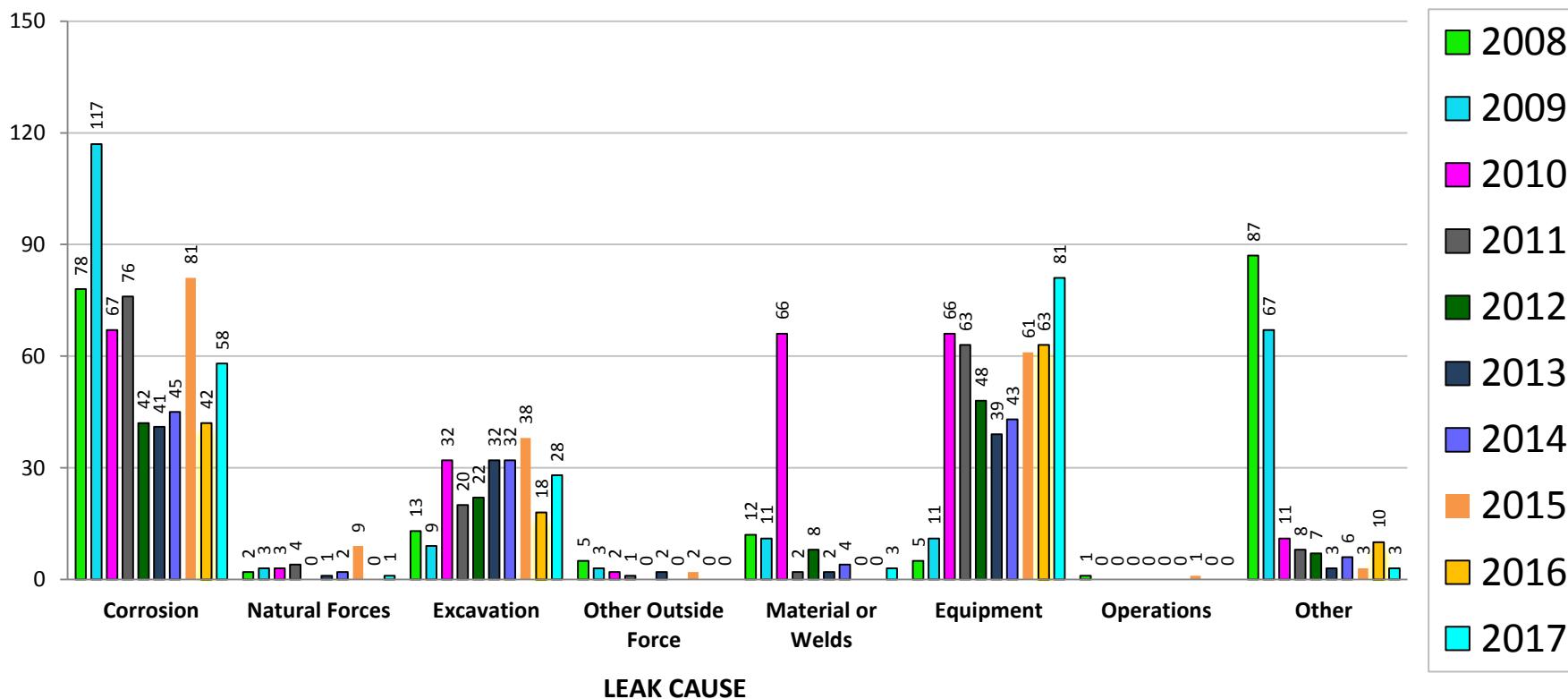


2017 SYSTEM INTEGRITY REPORT

EGC

SERVICE LEAKS REPAIRED COMPARISON BY LEAK CAUSES

LEAK REPAIRS

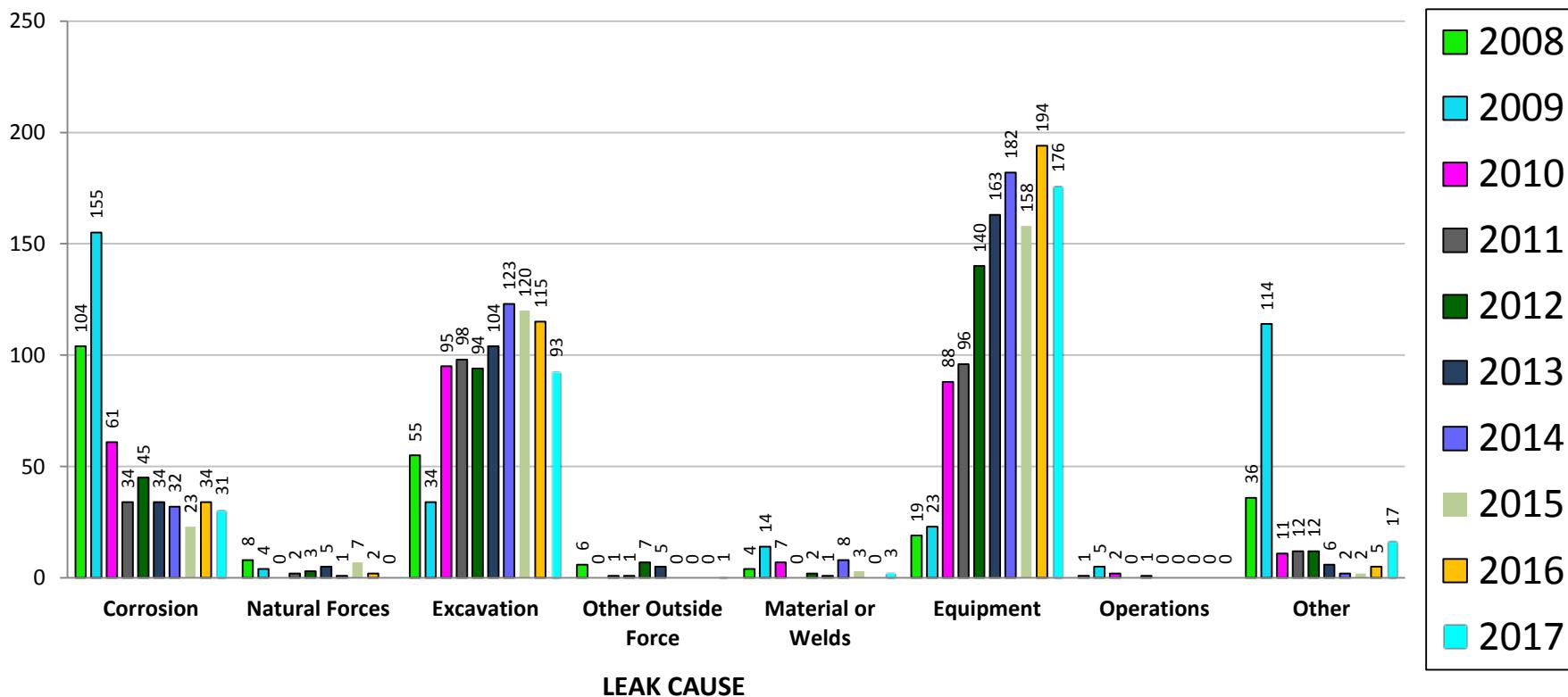


2017 SYSTEM INTEGRITY REPORT

CCC

SERVICE LEAKS REPAIRED COMPARISON BY LEAK CAUSES

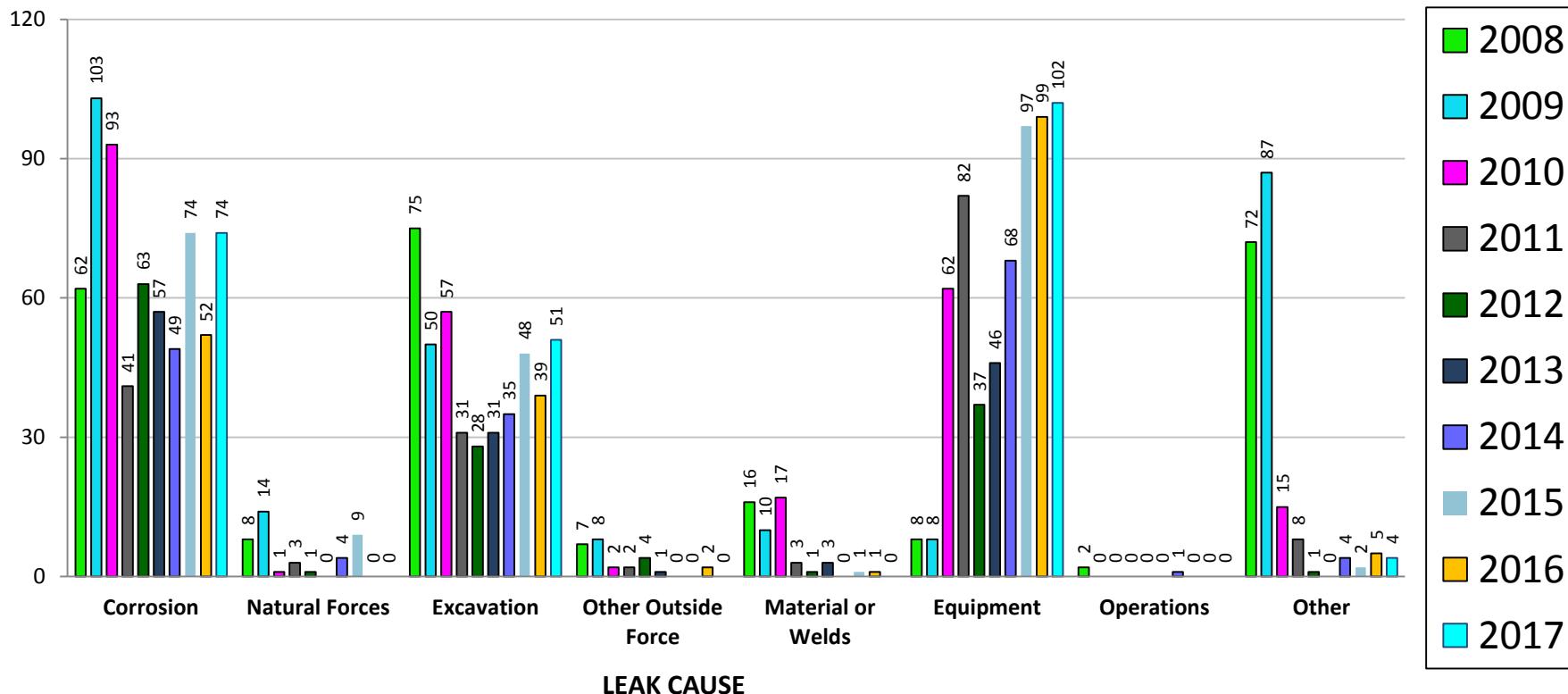
LEAK REPAIRS



2017 SYSTEM INTEGRITY REPORT

CLW SERVICE LEAKS REPAIRED COMPARISON BY LEAK CAUSES

LEAK REPAIRS

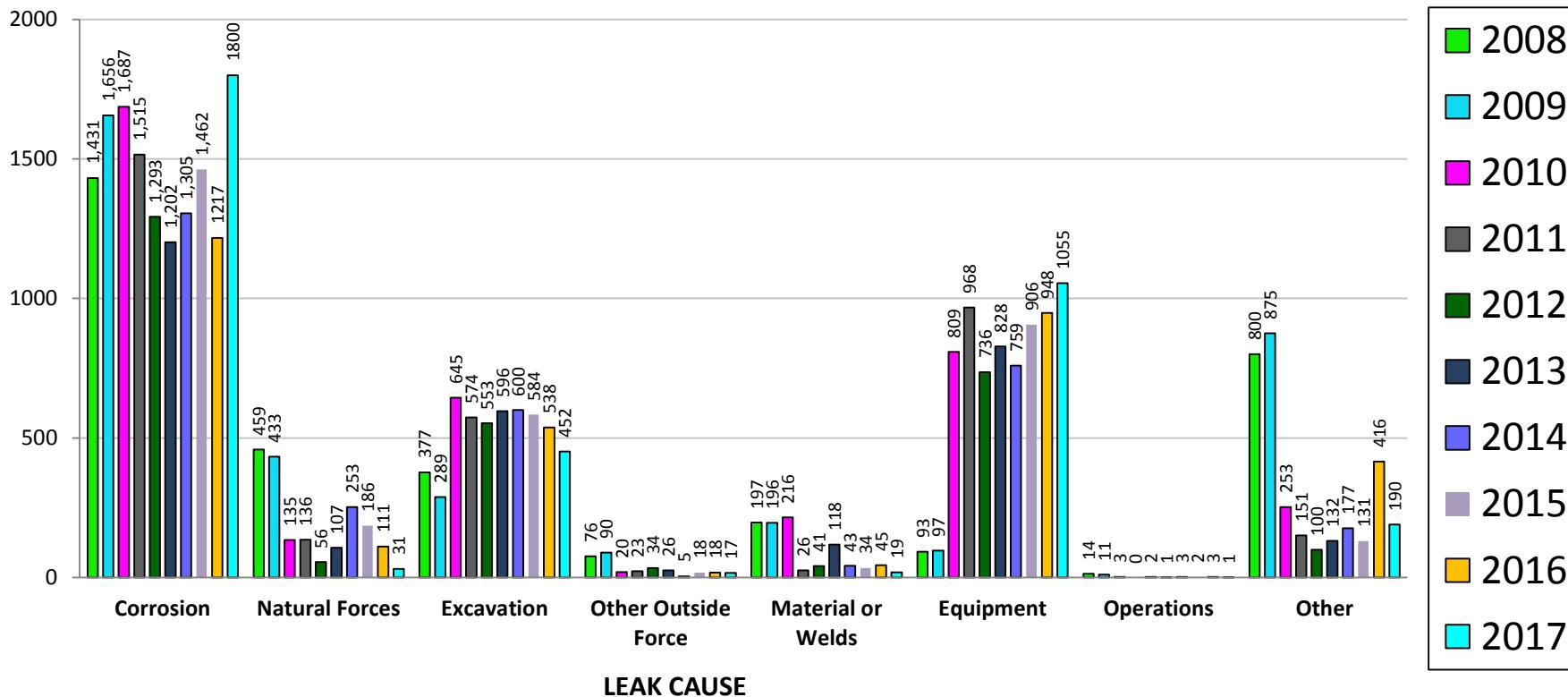


2017 SYSTEM INTEGRITY REPORT

MA

SERVICE LEAKS REPAIRED *COMPARISON BY LEAK CAUSES*

LEAK REPAIRS

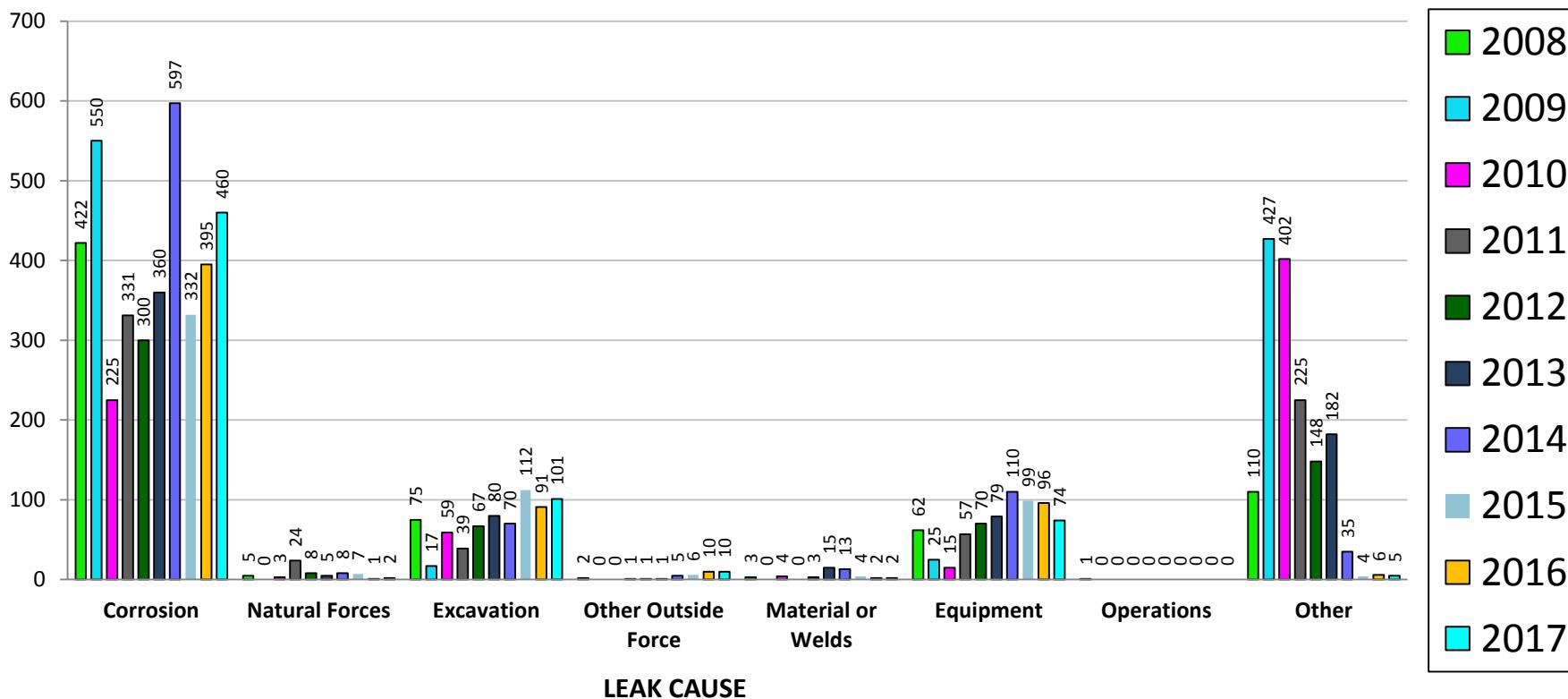


2017 SYSTEM INTEGRITY REPORT

RI

SERVICE LEAKS REPAIRED COMPARISON BY LEAK CAUSES

LEAK REPAIRS



nationalgrid

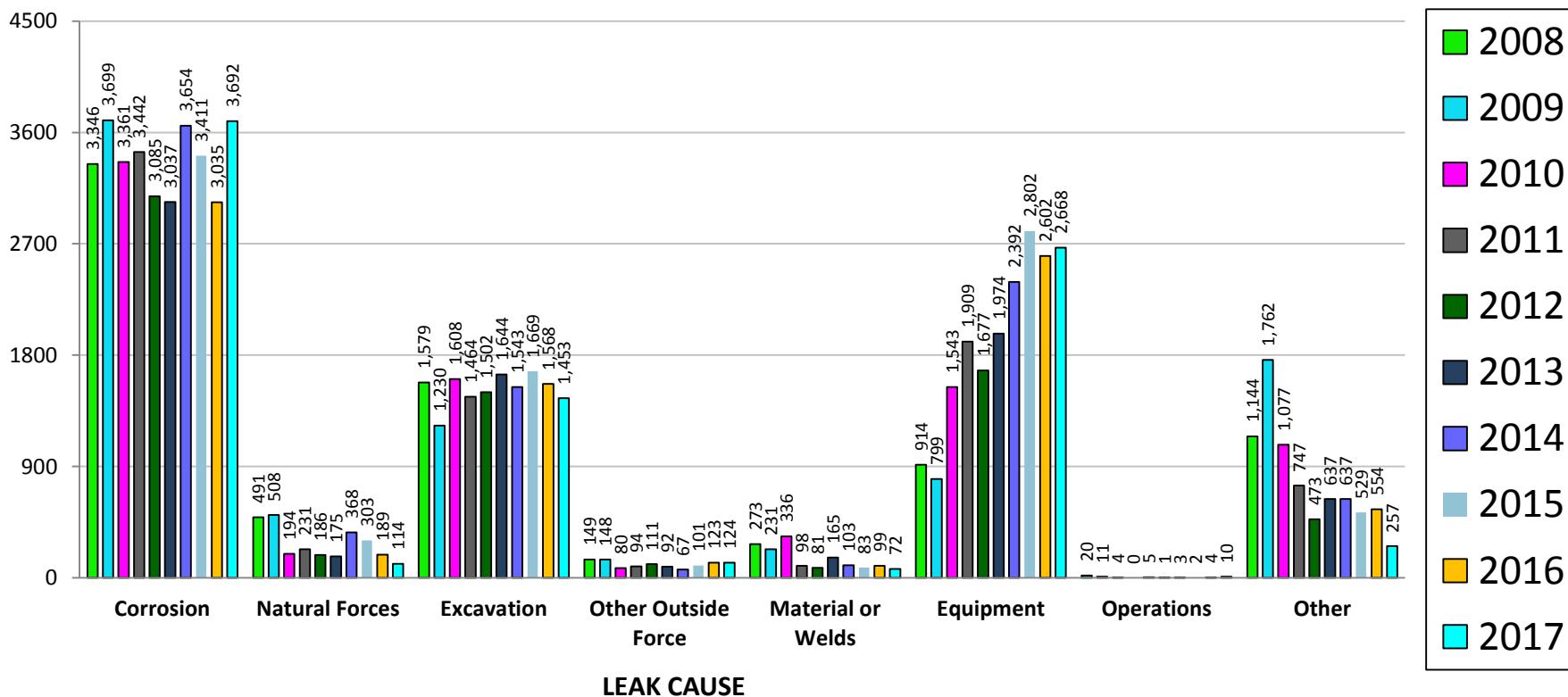
COUNTING EACH INDIVIDUAL REPAIR AS A LEAK

2017 SYSTEM INTEGRITY REPORT

NATIONAL GRID

SERVICE LEAKS REPAIRED COMPARISON BY LEAK CAUSES

LEAK REPAIRS

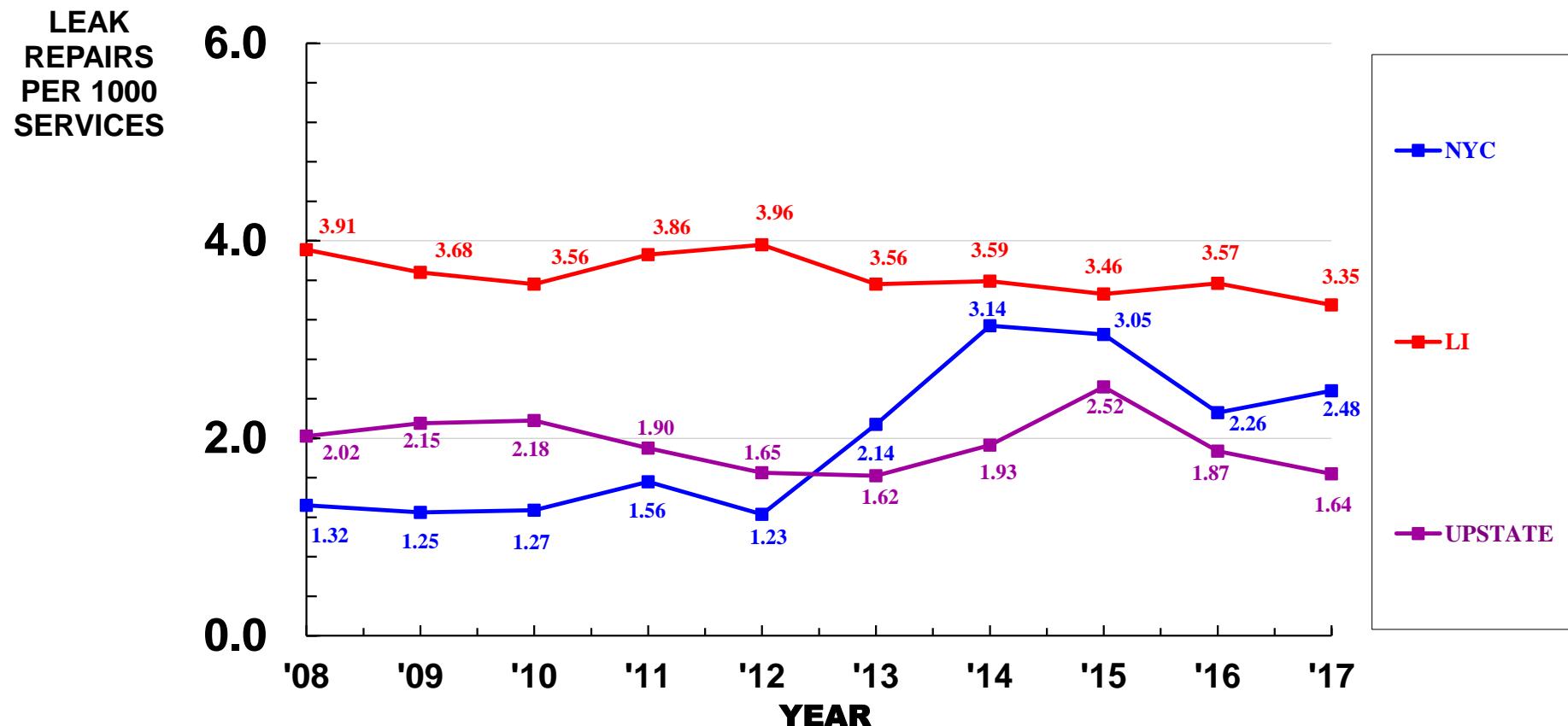


2017 SYSTEM INTEGRITY REPORT

TOTAL SERVICE LEAK "RATES"

NY-STATE

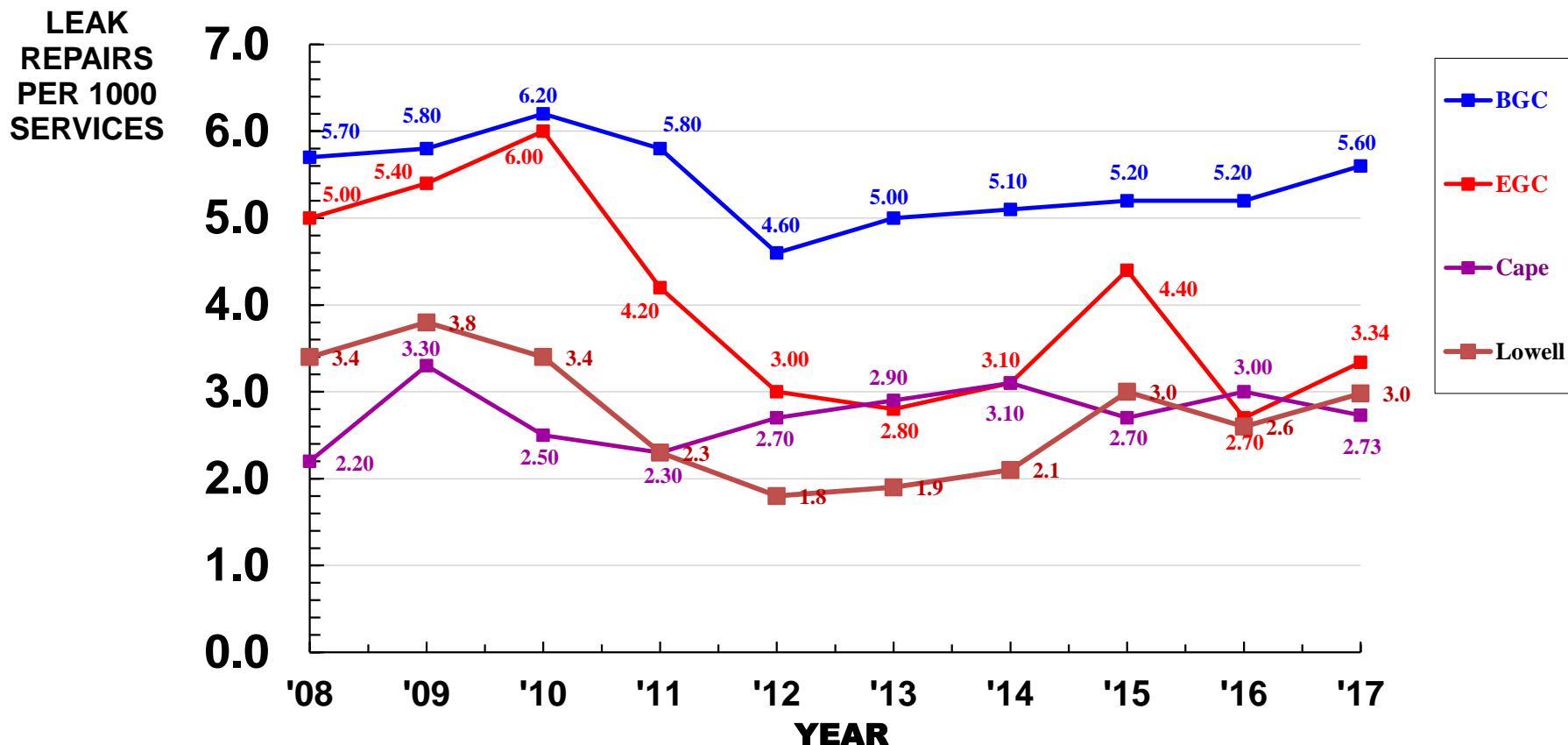
INCLUDING Damages



2017 SYSTEM INTEGRITY REPORT

MA TOTAL SERVICE LEAK "RATES"

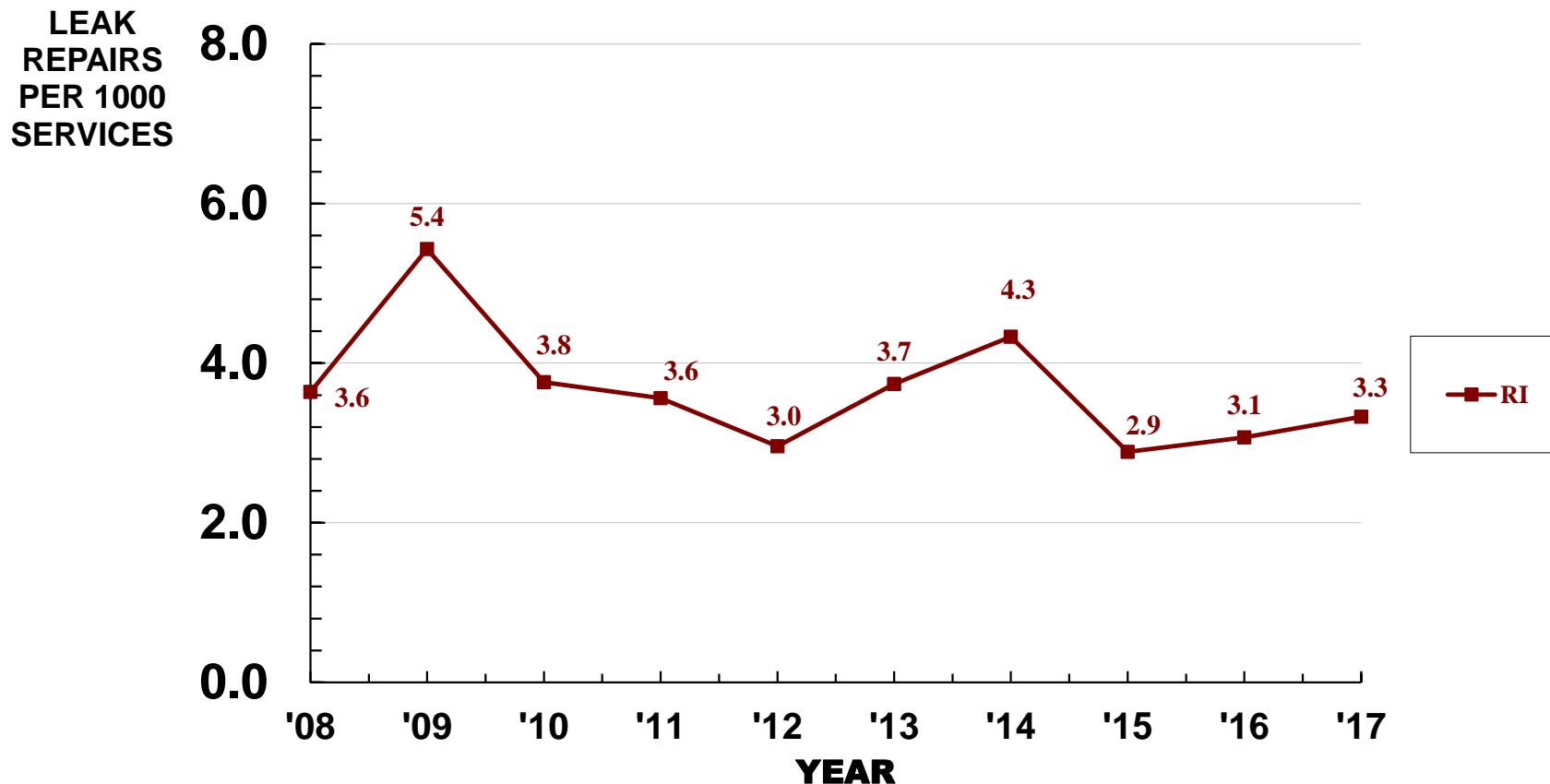
INCLUDING Damages



2017 SYSTEM INTEGRITY REPORT

RI TOTAL SERVICE LEAK "RATES"

INCLUDING Damages

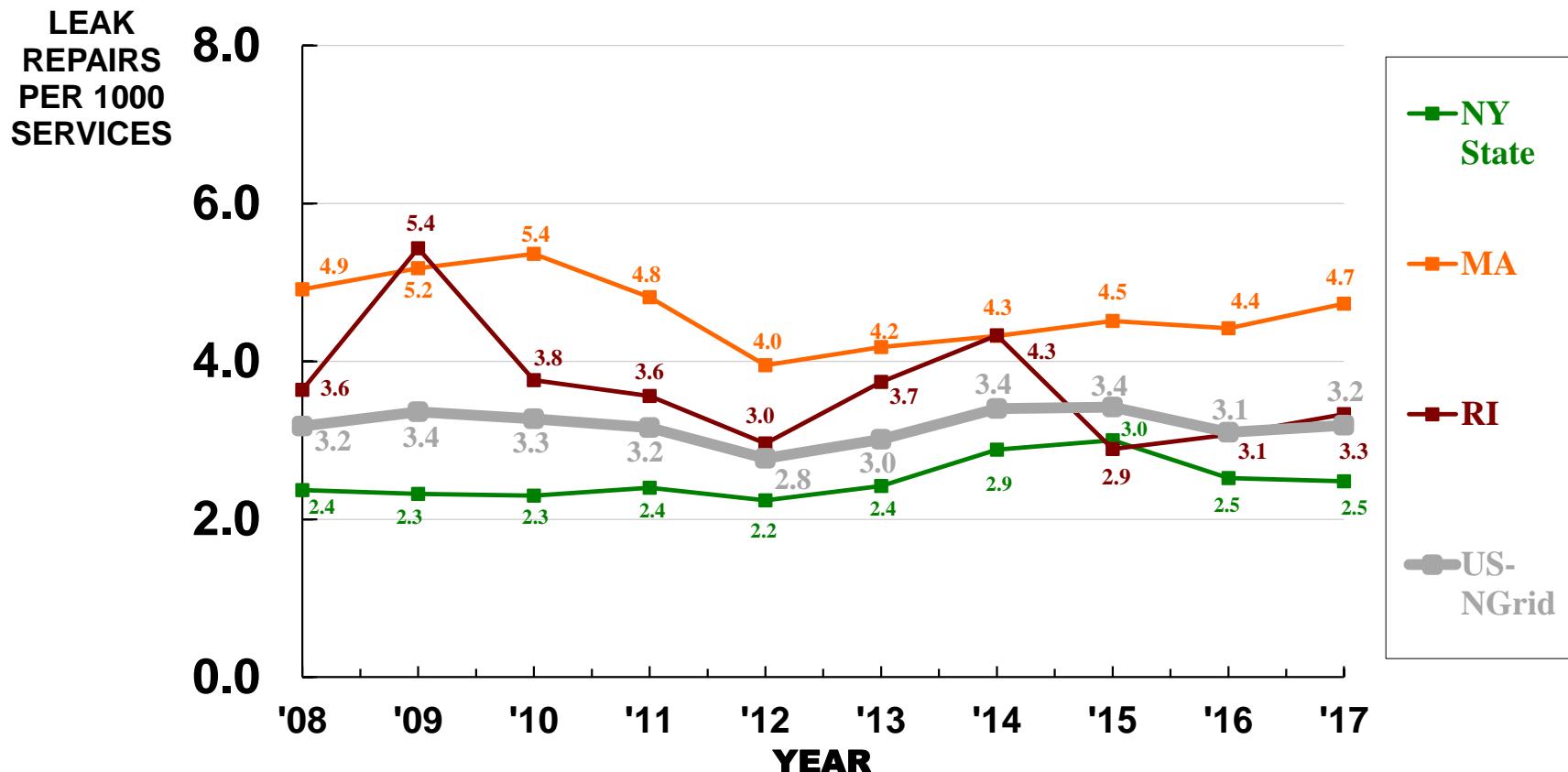


2017 SYSTEM INTEGRITY REPORT

TOTAL SERVICE LEAK “RATES”

US-NGrid

INCLUDING Damages



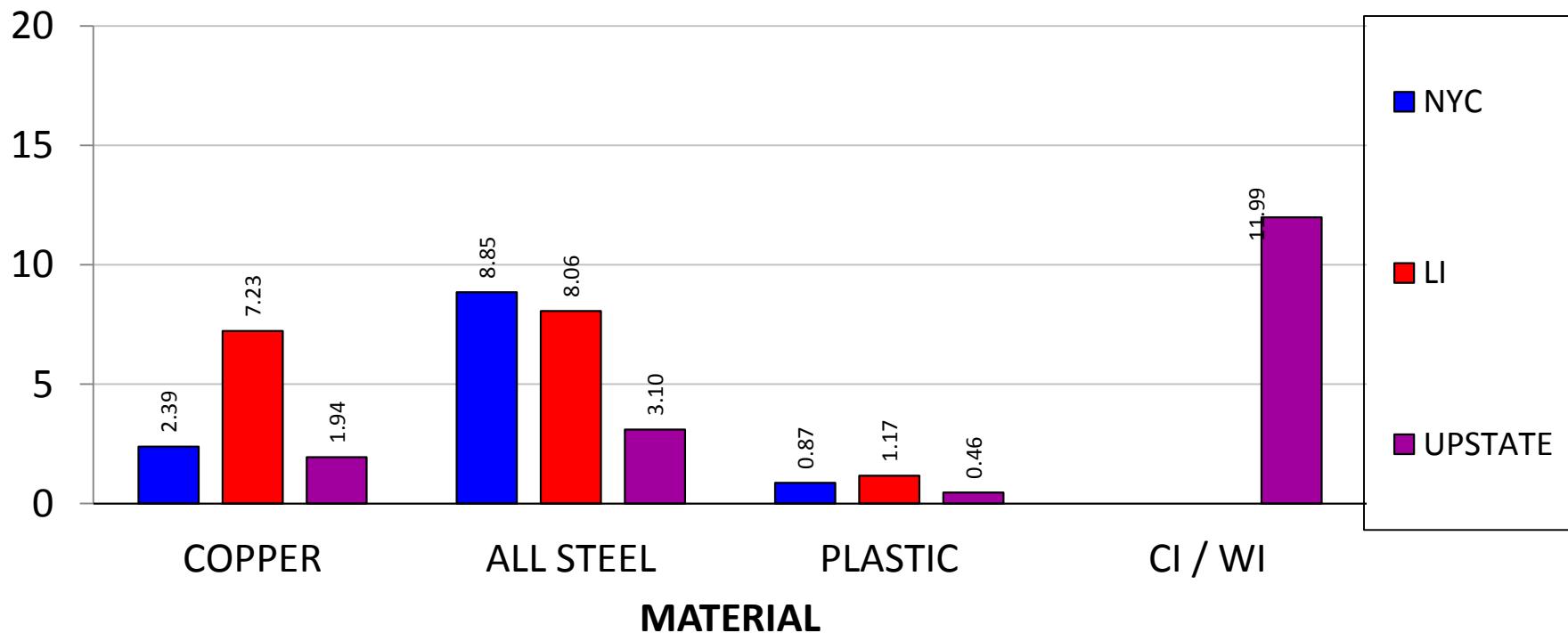
2017 SYSTEM INTEGRITY REPORT

NY State

SERVICE LEAK "RATES" COMPARISON BY MATERIAL

**LEAK REPAIRS
PER 1000 SERVICES**

EXCLUDING Damages

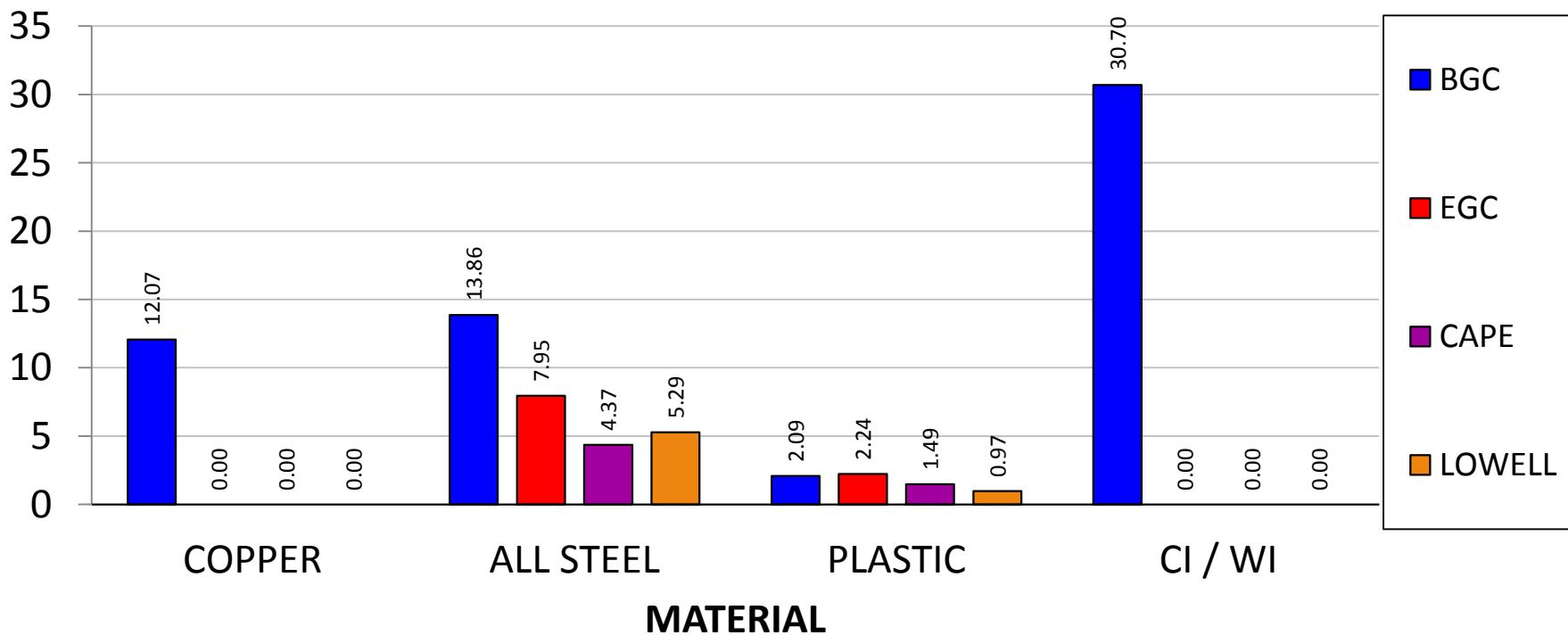


2017 SYSTEM INTEGRITY REPORT

MA

SERVICE LEAK "RATES" COMPARISON BY MATERIAL EXCLUDING Damages

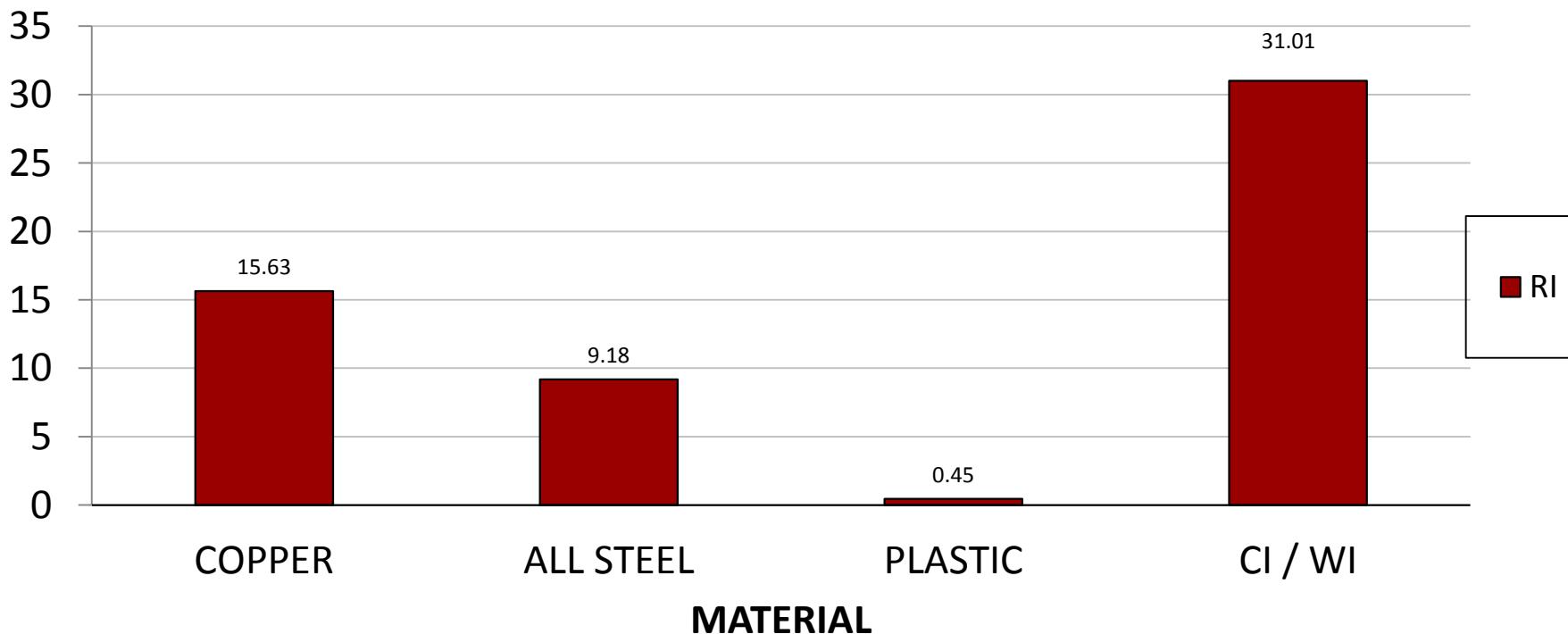
**LEAK REPAIRS
PER 1000 SERVICES**



2017 SYSTEM INTEGRITY REPORT

RI

SERVICE LEAK “RATES” COMPARISON BY MATERIAL EXCLUDING Damages

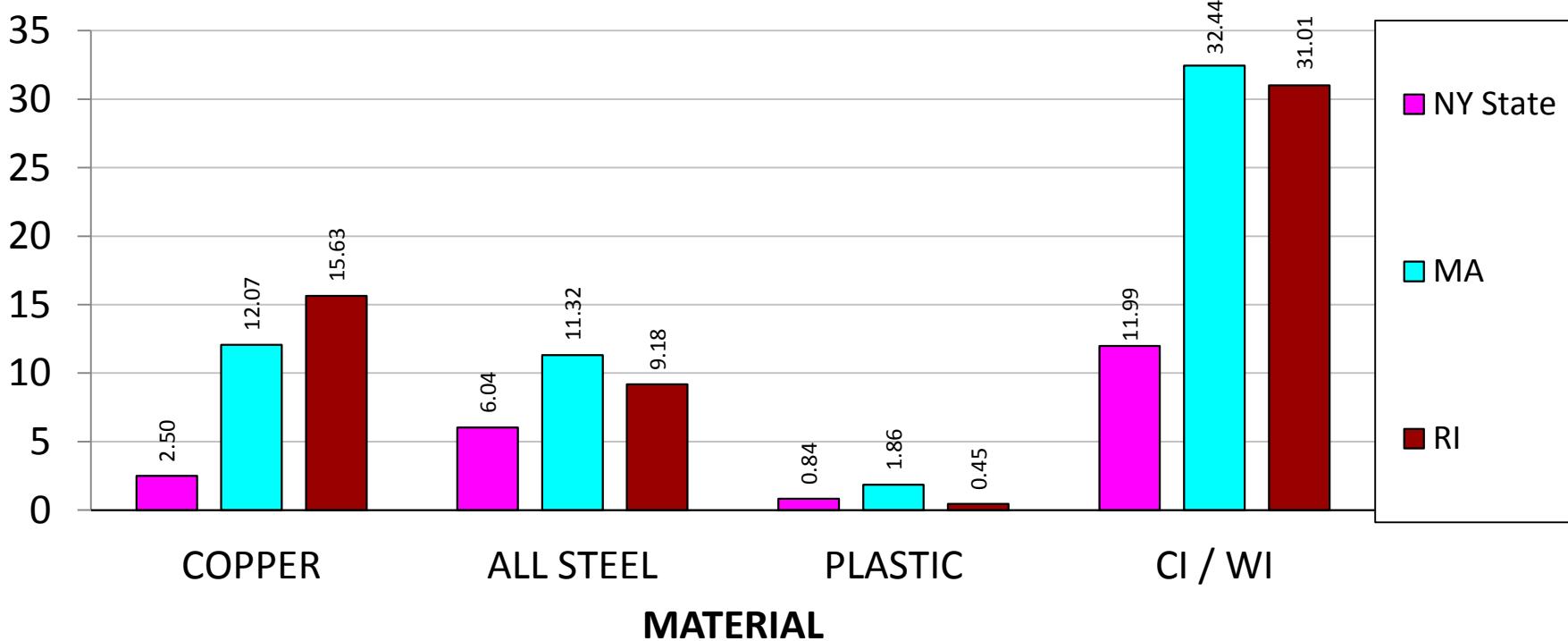
**LEAK REPAIRS
PER 1000 SERVICES**

2017 SYSTEM INTEGRITY REPORT

US-NGrid

SERVICE LEAK "RATES" COMPARISON BY MATERIAL EXCLUDING Damages

**LEAK REPAIRS
PER 1000 SERVICES**



2017 SYSTEM INTEGRITY REPORT

LPP Main Replacement

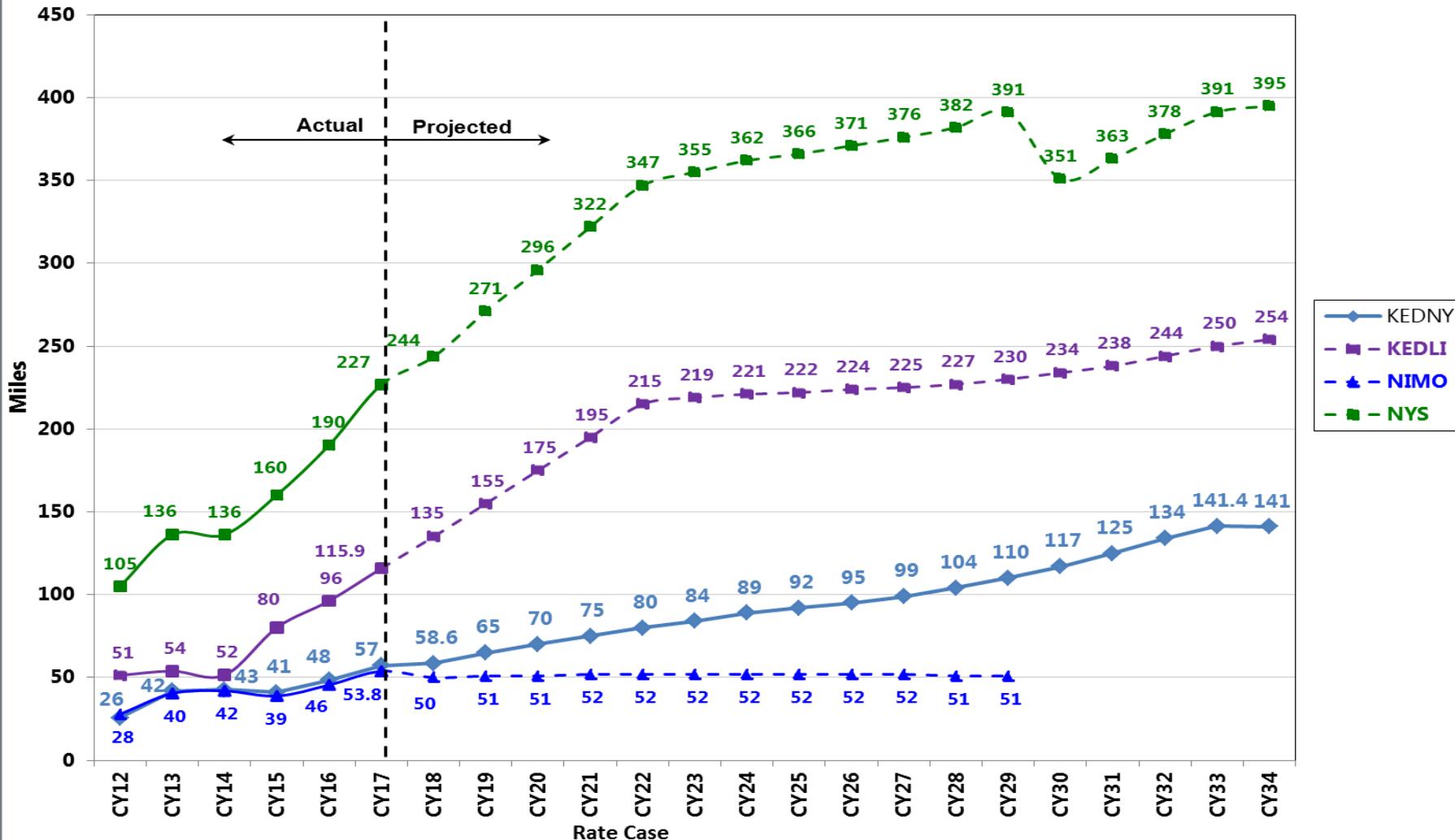
Gas Meter Purchases

2017 SYSTEM INTEGRITY REPORT

NYS – KEDNY, KEDLI & NMPC

NYS Leak Prone Pipe Main Replacement

Proactive Leak Prone Pipe, CSC, Reinforcement, Reliability and others

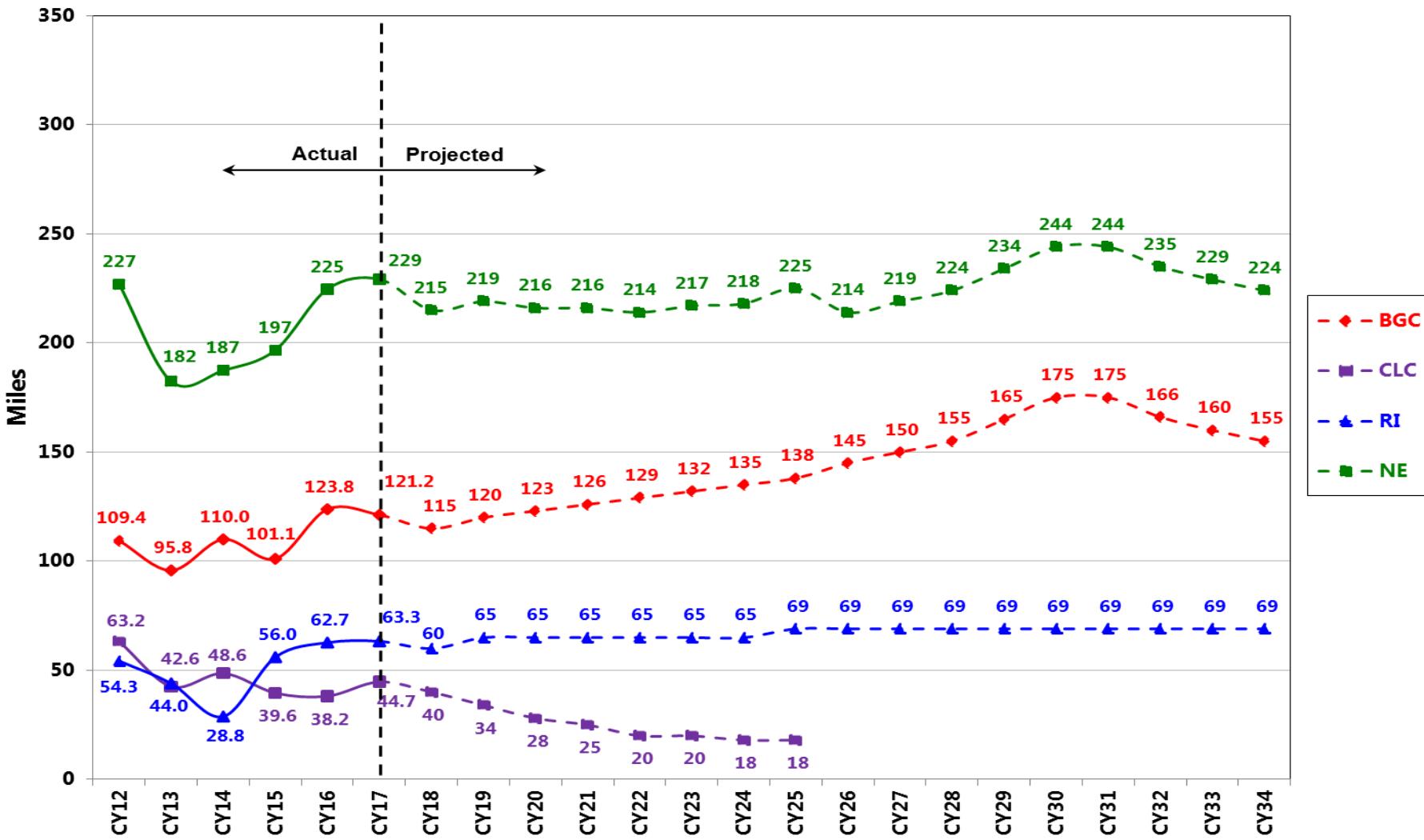


2017 SYSTEM INTEGRITY REPORT

NE - MA & RI

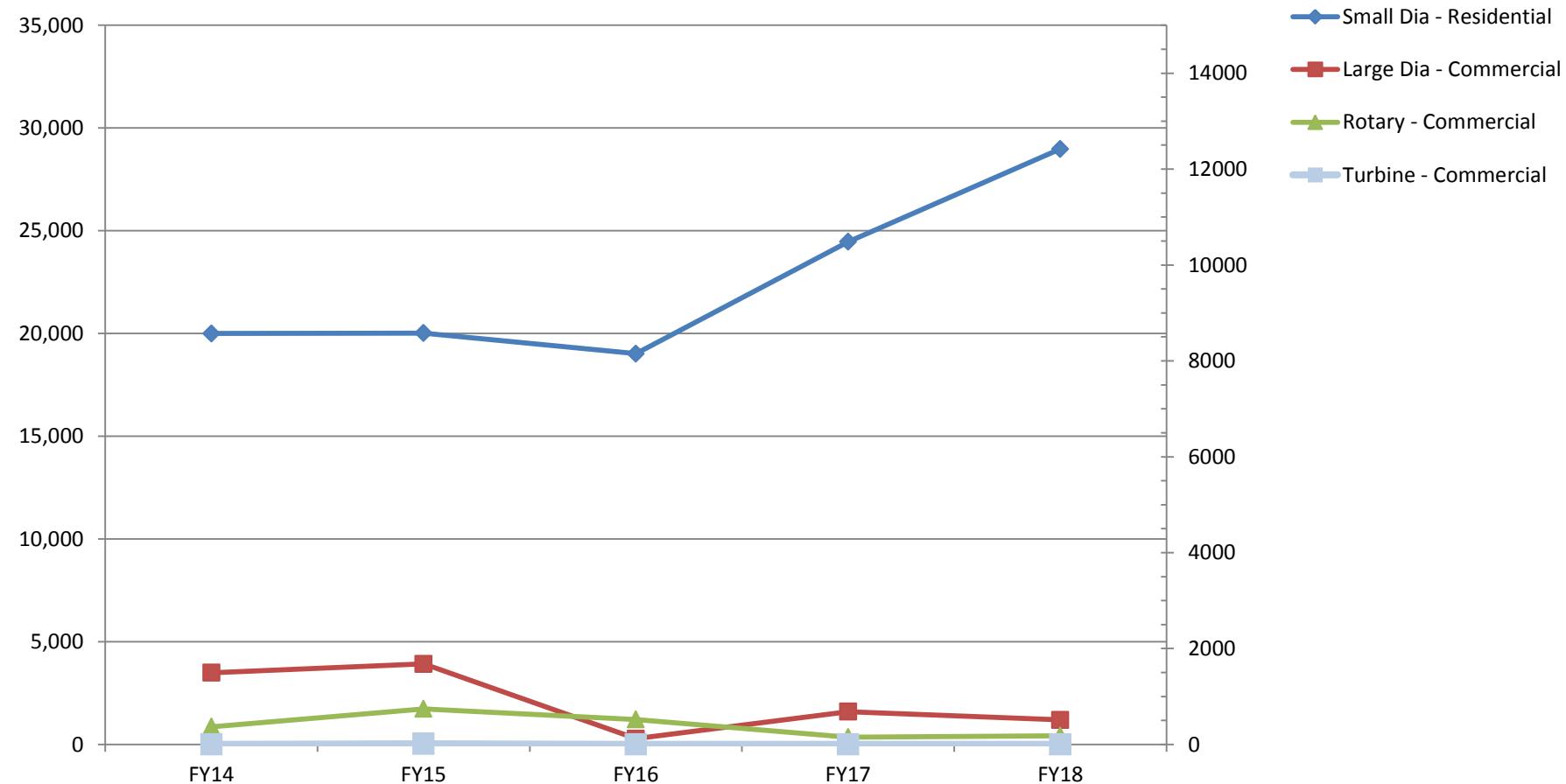
NE Leak Prone Pipe Main Replacement

Proactive Leak Prone Pipe, CSC, Reinforcement, Reliability and others



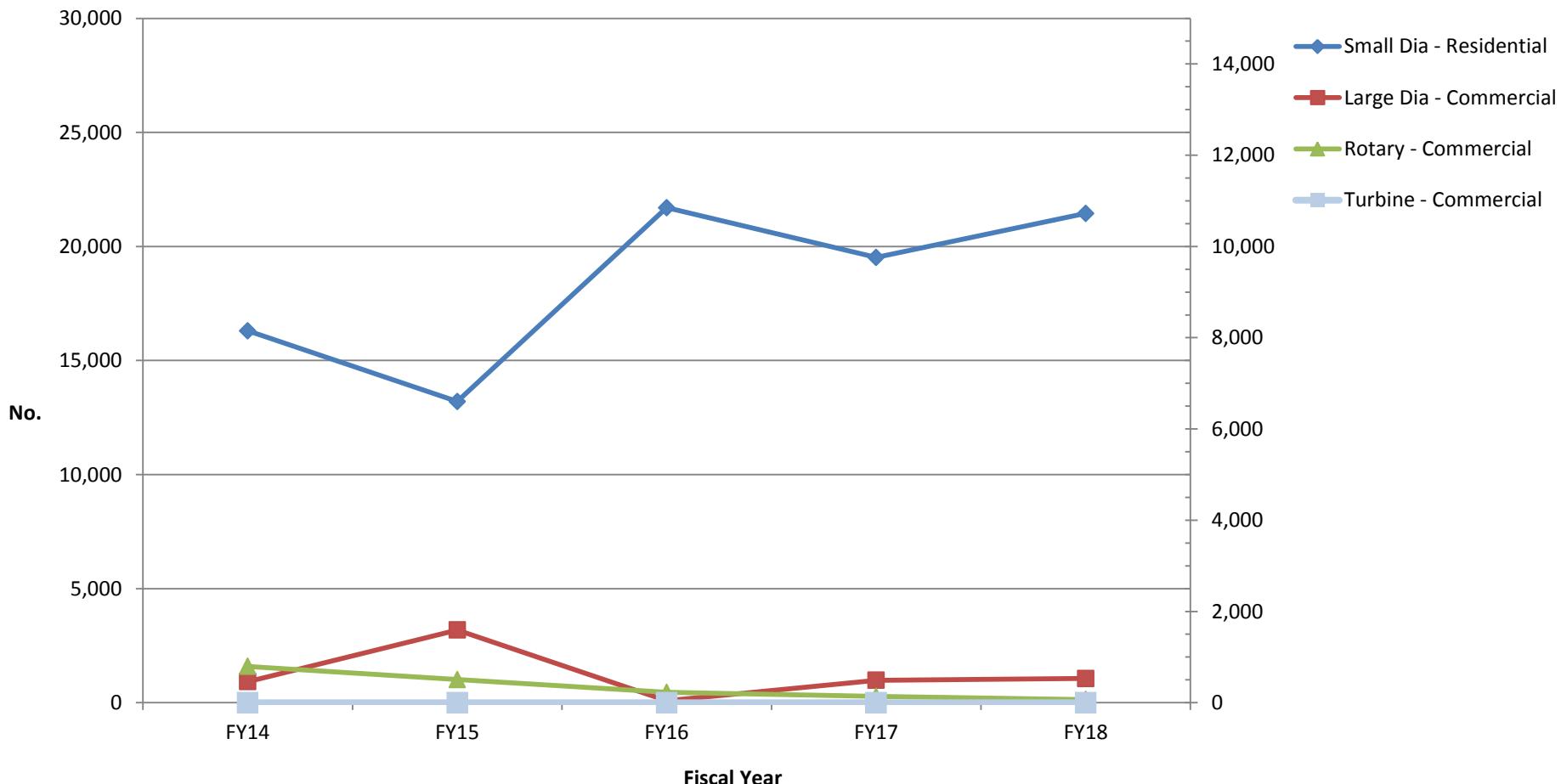
2017 SYSTEM INTEGRITY REPORT

NYC GAS METER PURCHASES *(by Fiscal Year)*



2017 SYSTEM INTEGRITY REPORT

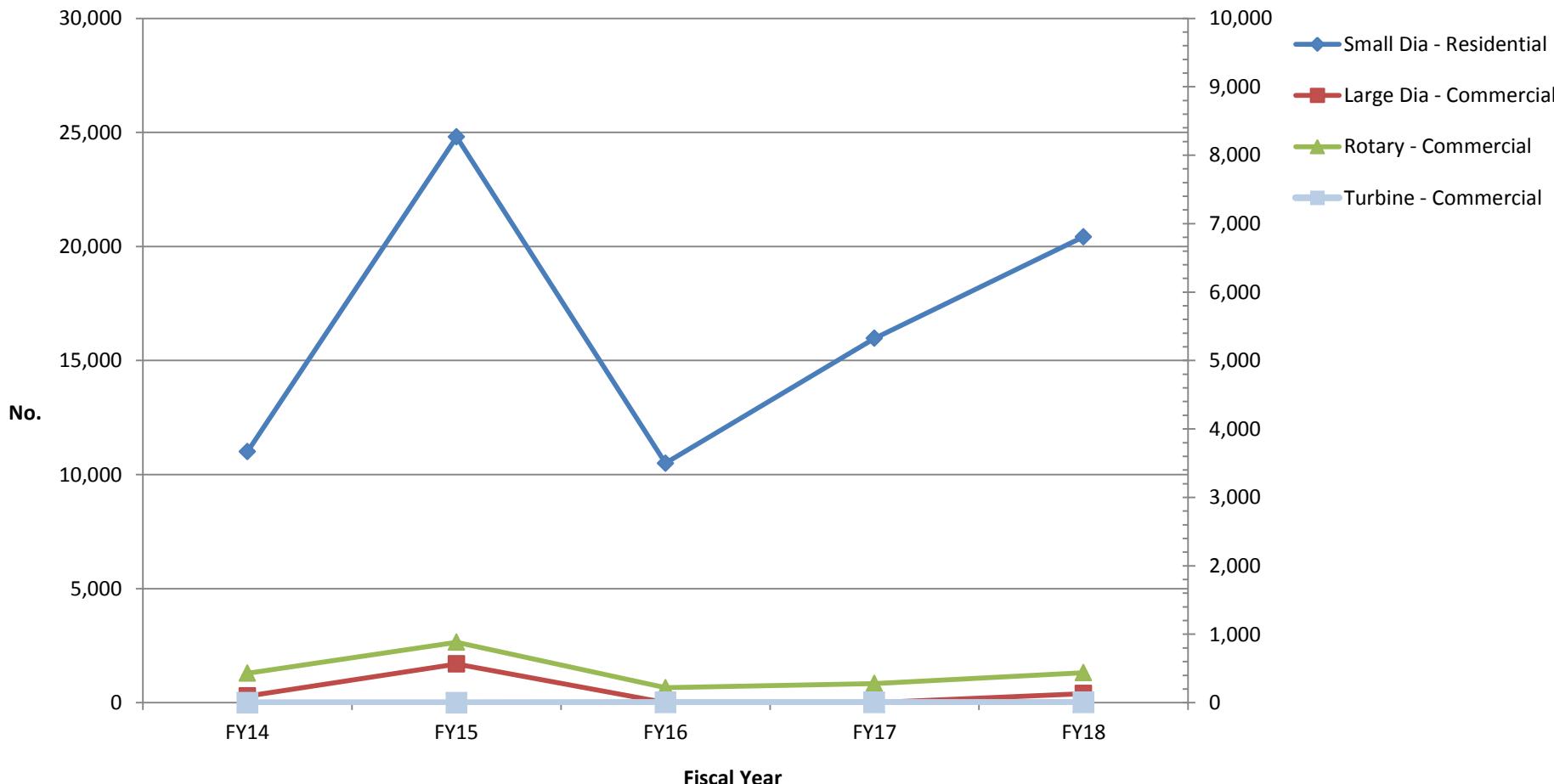
LI GAS METER PURCHASES (*by Fiscal Year*)



2017 SYSTEM INTEGRITY REPORT

UNY

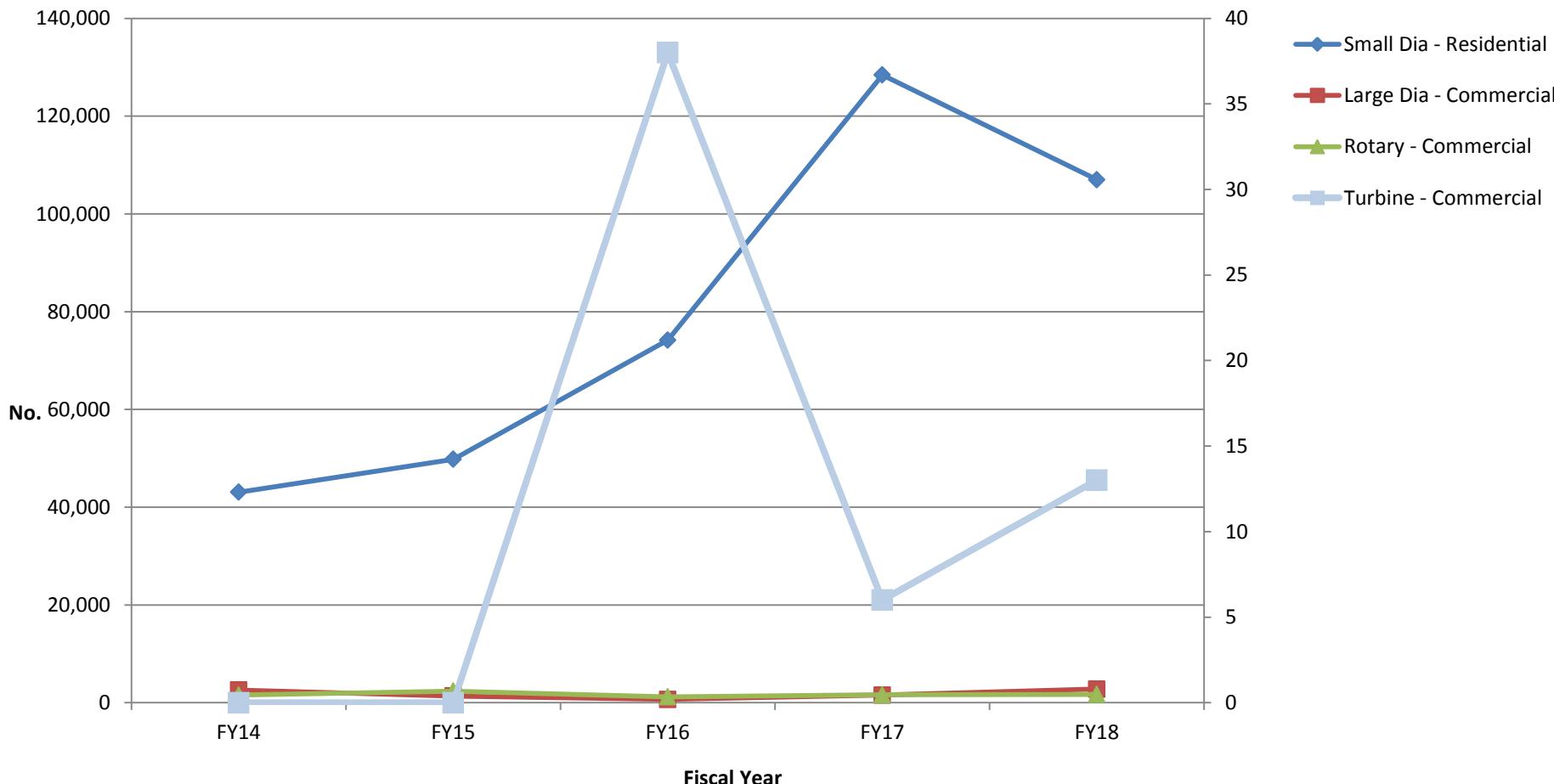
GAS METER PURCHASES *(by Fiscal Year)*



2017 SYSTEM INTEGRITY REPORT

BGC

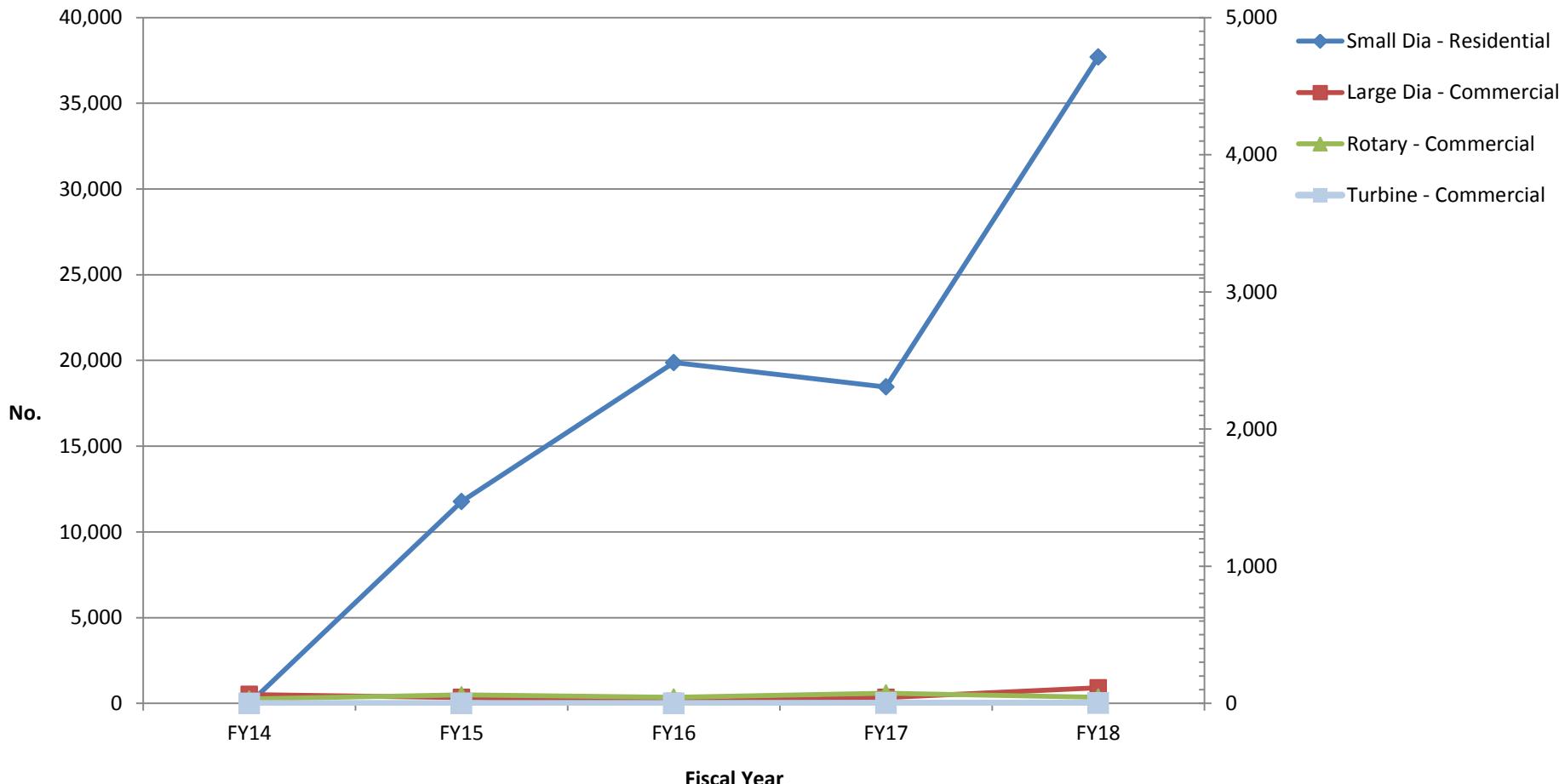
GAS METER PURCHASES *(by Fiscal Year)*



2017 SYSTEM INTEGRITY REPORT

CGC

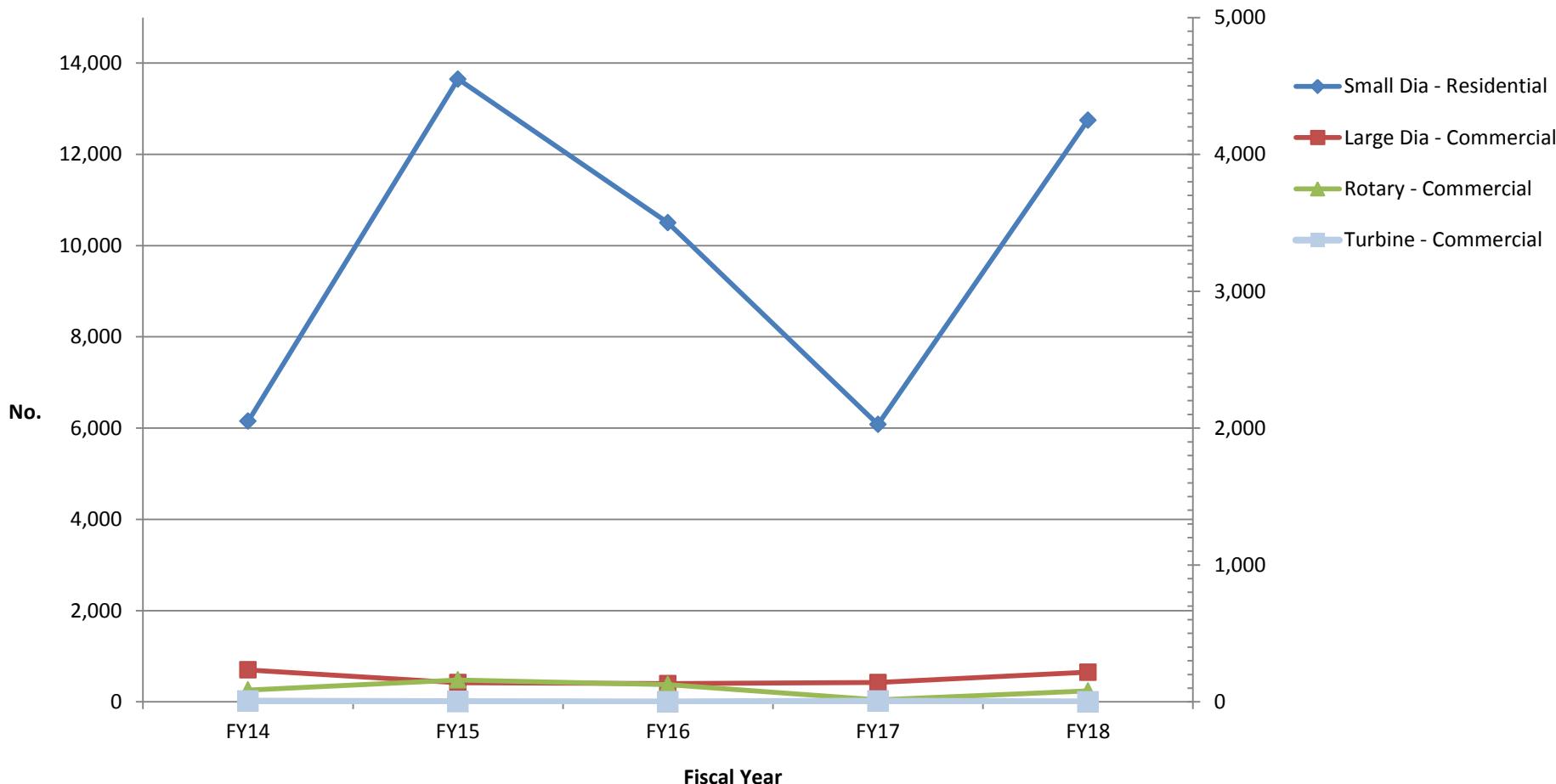
GAS METER PURCHASES *(by Fiscal Year)*

**nationalgrid***Note - FY14 no data available for Small diameter*

2017 SYSTEM INTEGRITY REPORT

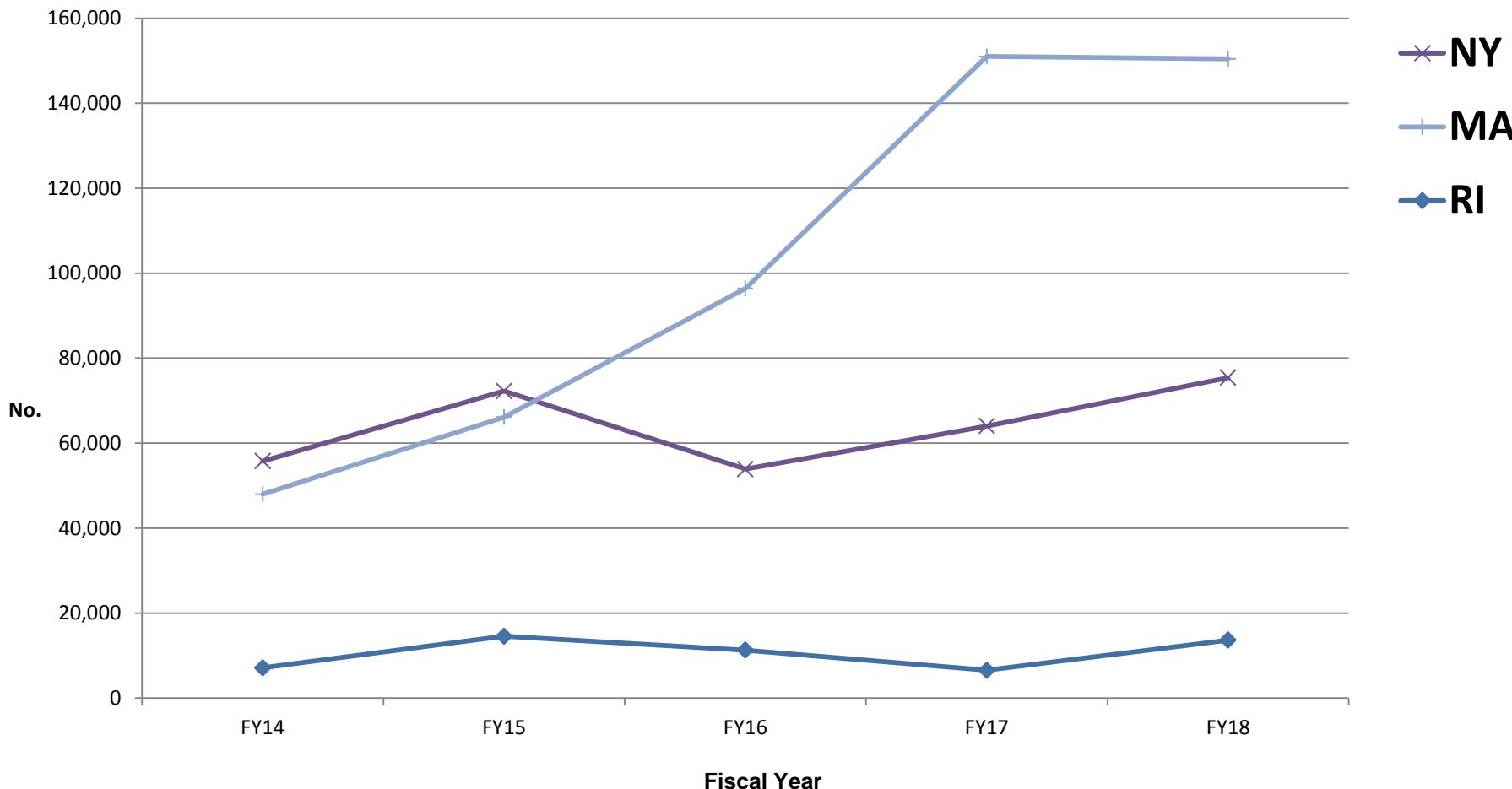
RI

GAS METER PURCHASES *(by Fiscal Year)*



2017 SYSTEM INTEGRITY REPORT

US-NGrid GAS METER PURCHASES *(by Fiscal Year)*



nationalgrid

Note – Above graph shows the total of Residential and Commercial data combined.

2017 SYSTEM INTEGRITY REPORT

2016/2017 DISTRIBUTION DOT REPORT DATA COMPARISONS



2017 SYSTEM INTEGRITY REPORT

General Data Correction																									
Explanation Needed																									
Discussed & Approved																									
2016 - 2017 DOT Comparisons		NYC					LI					Upstate					NY State								
		2017	2016	Delta(17-16)		%	2017	2016	Delta(17-16)		%	2017	2016	Delta(17-16)		%	2017	2016	Delta(16-15)						
Main Inventory	Cast Iron	1,355	miles	1,413	miles	-58	-4%	260	miles	276	miles	-16	-6%	406	miles	453	miles	-47	-10%	2,021	miles	2,142	miles	-121	
	Reconditioned Cast Iron	2	miles	0	miles	2	N/A	1	miles	0	miles	+1	N/A	0	miles	0	miles	0	N/A	3	miles	0	miles	3	
	Plastic	1,325	miles	1,241	miles	+84	7%	3,763	miles	3,603	miles	+160	4%	4,643	miles	4,544	miles	+99	2%	9,731	miles	9,388	miles	+343	
	UP Bare Steel	324	miles	318	miles	+6	2%	2,229	miles	2,305	miles	-76	-3%	53	miles	55	miles	-2	-4%	2,606	miles	2,678	miles	-72	
	UP Coated Steel	0	miles	0	miles	+0	0%	784	miles	787	miles	-3	0%	159	miles	163	miles	-4	-2%	943	miles	950	miles	-7	
	Total UP Steel	324	miles	318	miles	5.91	2%	3,013	miles	3,092	miles	-79	-3%	212	miles	218	miles	-6	-3%	3,549	miles	3,628	miles	-79	
	CP Bare Steel	0	miles	0	miles	+0	0%	40	miles	40	miles	+0	0%	0	miles	0	miles	+0	0%	40	miles	40	miles	+0	
	CP Coated Steel	1,135	miles	1,145	miles	-10	-0.9%	1,107	miles	1,102	miles	+5	0.5%	3,522	miles	3,530	miles	-8	-0.2%	5,764	miles	5,777	miles	-13	
	Total CP Steel	1,135	miles	1,145	miles	-10	-1%	1,147	miles	1,142	miles	5	0%	3,522	miles	3,530	miles	-8	0%	5,804	miles	5,817	miles	-13	
	Other	0	miles	0	miles	+0	0%	0	miles	0	miles	+0	0%	0	miles	0	miles	+0	0%	0	miles	0	miles	+0	
Main Leaks	Ductile Iron	0	miles	0	miles	+0	0%	0	miles	0	miles	+0	0%	0	miles	0	miles	+0	0%	0	miles	0	miles	+0	
	TOTAL MAIN	4,141	miles	4,118	miles	+23	0.6%	8,184	miles	8,113	miles	+71	0.9%	8,783	miles	8,745	miles	+38	0.4%	21,108	miles	20,976	miles	+132	
	Corrosion	167	repairs	171	repairs	-4	-2%	572	repairs	640	repairs	-68	-11%	77	repairs	83	repairs	-6	-7%	816	repairs	894	repairs	-78	
	Natural Forces	101	repairs	111	repairs	-10	-9%	73	repairs	75	repairs	-2	-3%	90	repairs	74	repairs	+16	22%	264	repairs	260	repairs	+4	
	Excavation	39	repairs	36	repairs	+3	8%	78	repairs	84	repairs	-6	-7%	30	repairs	48	repairs	-18	-38%	147	repairs	168	repairs	-21	
	Other Outside Force	5	repairs	9	repairs	-4	600%	9	repairs	2	repairs	+7	350%	3	repairs	4	repairs	-1	N/A	17	repairs	15	repairs	+2	
	Material or Welds	0	repairs	0	repairs	+0	#DIV/0!	35	repairs	37	repairs	-2	-5%	6	repairs	10	repairs	-4	-40%	41	repairs	47	repairs	-6	
	Equipment	140	repairs	137	repairs	+3	2%	218	repairs	343	repairs	-125	-36%	49	repairs	107	repairs	-58	-54%	407	repairs	587	repairs	-180	
	Operations	0	repairs	0	repairs	+0	0%	6	repairs	1	repairs	+5	0%	0	repairs	0	repairs	+0	0%	6	repairs	1	repairs	+5	
	Other	2,786	repairs	2,710	repairs	+76	3%	100	repairs	117	repairs	-17	-15%	274	repairs	375	repairs	-101	-27%	3,160	repairs	3,202	repairs	-42	
Service Inventory	TOTAL MAIN LEAKS	3,238	repairs	3,174	repairs	+64	2%	1,091	repairs	1,299	repairs	-208	-16%	529	repairs	701	repairs	-172	-25%	4,858	repairs	5,174	repairs	-316	
	Copper	111,065	svcs	115,291	svcs	-4226	-4%	4,290	svcs	4,973	svcs	-683	-14%	15,939	svcs	16,501	svcs	-562	-3%	131,294	svcs	136,765	svcs	-5471	
	Plastic	393,930	svcs	385,825	svcs	+8105	2%	430,006	svcs	421,376	svcs	-8630	2%	408,725	svcs	401,394	svcs	+7331	2%	1,232,661	svcs	1,208,595	svcs	+24066	
	UP Bare Steel	26,896	svcs	29,038	svcs	-2142	-7%	31,082	svcs	31,180	svcs	-98	0%	28,535	svcs	30,522	svcs	-1987	-7%	86,513	svcs	90,740	svcs	-4227	
	UP Coated Steel	0	svcs	0	svcs	+0	0%	46,919	svcs	51,617	svcs	-4698	-9%	95,588	svcs	98,017	svcs	-2429	-2%	142,507	svcs	149,634	svcs	-7127	
	Total UP Steel	26,896	svcs	29,038	svcs	-2142.00	-7%	78,001	svcs	82,797	svcs	-4796	-6%	124,123	svcs	128,539	svcs	-4416	-3%	229,020	svcs	240,374	svcs	-11354.000	
	CP Bare Steel	0	svcs	0	svcs	+0	0%	12,743	svcs	13,001	svcs	-258	-2%	0	svcs	0	svcs	+0	0%	12,743	svcs	13,001	svcs	-258	
	CP Coated Steel	36,955	svcs	37,889	svcs	-934	-2%	21,885	svcs	22,027	svcs	-142	-1%	14,710	svcs	14,167	svcs	+543	4%	73,550	svcs	74,083	svcs	-533	
	Other	0	svcs	0	svcs	+0	0%	0	svcs	0	svcs	+0	0%	0	svcs	0	svcs	+0	0%	0	svcs	0	svcs	+0	
	Cast Iron / Wrought Iron	0	svcs	0	svcs	+0	0%	0	svcs	0	svcs	+0	0%	417	svcs	862	svcs	-445	-52%	417	svcs	862	svcs	-445	
Service Leaks Excluding Above Ground Leaks	TOTAL SERVICES	568,846	svcs	568,043	svcs	+803	0.1%	546,925	svcs	544,174	svcs	+2751	0.5%	563,914	svcs	561,463	svcs	+2451	0.4%	1,679,685	svcs	1,673,680	svcs	+6005	
	Corrosion	288	repairs	256	repairs	+32	13%	820	repairs	853	repairs	-33	-4%	323	repairs	318	repairs	+5	2%	1,431	repairs	1,427	repairs	+4	
	Natural Forces	45	repairs	27	repairs	+18	67%	3	repairs	4	repairs	-1	-25%	30	repairs	46	repairs	-16	-35%	78	repairs	77	repairs	+1	
	Excavation	237	repairs	220	repairs	+17	8%	391	repairs	445	repairs	-54	-12%	272	repairs	270	repairs	+2	1%	900	repairs	935	repairs	-35	
	Other Outside Force	60	repairs	51	repairs	+9	18%	18	repairs	23	repairs	-5	-22%	1	repairs	23	repairs	-22	-98%	79	repairs	97	repairs	-18	
	Material or Welds	2	repairs	6	repairs	-4	-67%	24	repairs	20	repairs	+4	20%	21	repairs	29	repairs	-8	-28%	47	repairs	55	repairs	-8	
	Equipment	774	repairs	722	repairs	+52	7%	565	repairs	580	repairs	-15	-3%	196	repairs	254	repairs	-58	-23%	1,535	repairs	1,566	repairs	-21	
	Operations	6	repairs	0	repairs	+6	0%	2	repairs	1	repairs	+1	0%	1	repairs	0	repairs	+1	0%	9	repairs	1	repairs	+8	
	Other	0	repairs	0	repairs	+0	#DIV/0!	11	repairs	17	repairs	-6	-35%	37	repairs	113	repairs	-76	-67%	48	repairs	130	repairs	-82	
	TOTAL SVC LEAKS	1,412	repairs	1,282	repairs	+130	10%	1,834	repairs	1,943	repairs	-109	-6%	881	repairs	1,053	repairs	-172	-16%	4,127	repairs	4,278	repairs	-151	
Service Leaks Including Above Ground Leaks	Corrosion	288	repairs	256	repairs	+32	13%	820	repairs	853	repairs	-33	-4%	324	repairs	319	repairs	+5	2%	1,432	repairs	1,428	repairs	+4	
	Natural Forces	45	repairs	27	repairs	+18	67%	3	repairs	4	repairs	-1	-25%	34	repairs	49	repairs	-15	-31%	82	repairs	80	repairs	+2	
	Excavation	237	repairs	220	repairs	+17	8%	391	repairs	445	repairs	-54	-12%	272	repairs	290	repairs	-18	-6%	900	repairs	955	repairs	-55	
	Other Outside Force	60	repairs	51	repairs	+9	18%	18	repairs	23	repairs	-5	-22%	19	repairs	24	repairs	-5	-21%	97	repairs	98	repairs	-1	
	Material or Welds	2	repairs	6	repairs	-4	-67%	24	repairs	20	repairs	+4	20%	24	repairs	29	repairs	-5	-17%	50	repairs	55	repairs	-5	
	Equipment	774	repairs	722	repairs	+52	7%	565	repairs	582	repairs	-17	-3%	198	repairs	265	repairs	-67	-25%	1,537	repairs	1,569	repairs	-32	
	Operations	6	repairs	0	repairs	+6	0%	2	repairs	1	repairs	+1	0%	1	repairs	0	repairs	+1	0%	9	repairs	1	repairs	+8	
	Other	0	repairs	0	repairs	+0	#DIV/0!	11	repairs	17	repairs	-6	-35%	53	repairs	113	repairs	-60	-53%	64	repairs	130	repairs	-66	
	TOTAL SVC LEAKS	1,412	repairs	1,282	repairs	+130	10%	1,834	repairs	1,945	repairs	-111	-6%	925	repairs	1,089	repairs	-164	-15%	4,171	repairs	4,316	repairs	-145	
	Total Leak Repairs (Main & Service)	4,650	repairs	4,456	repairs	+194	4%	2,925	repairs	3,242	repairs	-317	-10%	1,410	repairs	1,754	repairs	-344	-20%	8,985	repairs	9,452	repairs	-467	
Excluding Above Ground Leaks		Total Leak Repairs (Main & Service)	4,650	repairs	4,456	repairs	+194	4%	2,925	repairs	3,244	repairs	-319	-10%	1,454	repairs	1,790	repairs	-336	-19%	9,029	repairs	9,490	repairs	-461
Including Above Ground Leak		Workable Backlog As of 12/31	8	leaks	23	leaks	-15	-65%	0	leaks	0	leaks	+0	#DIV/0!	8	leaks	21	leaks	-13	0%	16	leaks	44	leaks	-28
UFG (Net)		2.0%		1.8%		0.002	11%	4.0%		3.3%		0.01	21%	2.6%		-0.6%	3.20%	-533%	2.4%		2.7%		-0.30%		
Average Service Length (ft)		45.0	ft	45.0	ft	+0	0%	65.0	ft	65.0	ft	+0	0%	72.9	ft	73.0	ft	-0.1	0%	60.9	ft	60.9	ft	-0.02	

2017 SYSTEM INTEGRITY REPORT

General Data Correction																								
Explanation Needed																								
Discussed & Approved																								
2016 - 2017 DOT Comparisons		BGC						EGC						CCC										
		2017	2016	Delta(17-16)	%	2017	2016	Delta(17-16)	%	2017	2016	Delta(17-16)	%	2017	2016	Delta(17-16)	%	2017	2016					
Main Inventory	Cast Iron	1,768	miles	1,834	miles	-66	-3.6%	73	miles	76	miles	-3	-4.0%	0	miles	+0	NA	90	miles	96	miles			
	Reconditioned Cast Iron	5	miles	5	miles	+0	0.0%	0	miles	0	miles	+0	NA	0	miles	+0	NA	0	miles	5	miles			
	Plastic	2,533	miles	2,389	miles	+145	6.1%	444	miles	440	miles	+4	0.9%	1,738	miles	1,704	miles	+34	2.0%	716	miles	693	miles	
	UP Bare Steel	651	miles	695	miles	-44	-6.3%	9	miles	9	miles	-0	0.0%	32	miles	44	miles	-12	-27.0%	18	miles	19	miles	
	UP Coated Steel	436	miles	450	miles	-14	-3.1%	9	miles	9	miles	-0	0.0%	16	miles	21	miles	-6	-28.3%	48	miles	51	miles	
	Total UP Steel	1,087	miles	1,145	miles	-58	-5.1%	18	miles	19	miles	-0	0.0%	48	miles	66	miles	-18	-27.4%	66	miles	70	miles	
	CP Bare Steel	123	miles	125	miles	-2	-1.6%	11	miles	12	miles	-0	0.0%	8	miles	8	miles	+0	0.0%	1	miles	1	miles	
	CP Coated Steel	851	miles	863	miles	-12	-1.4%	320	miles	320	miles	-1	-0.3%	682	miles	699	miles	-17	-2.4%	525	miles	535	miles	
	Total CP Steel	974	miles	988	miles	-14	-1.4%	331	miles	332	miles	-1	-0.3%	690	miles	707	miles	-17	-2.4%	526	miles	536	miles	
	Other	0	miles	0	miles	+0	0.0%	0	miles	0	miles	+0	NA	0	miles	+0	NA	0	miles	0	miles	+0	NA	
Main Leaks	Ductile Iron	0	miles	0	miles	+0	NA	0	miles	0	miles	+0	NA	0	miles	+0	NA	0	miles	0	miles	+0	NA	
	TOTAL MAIN	6,367	miles	6,360	miles	+6	0.1%	866	miles	866	miles	+0	0.0%	2,475	miles	2,476	miles	-1	0.0%	1,397	miles	1,394	miles	
	Corrosion	1068	repairs	720	repairs	+348	48.3%	12	repairs	35	repairs	-23	-65.7%	48	repairs	62	repairs	-14	-22.6%	64	repairs	32	repairs	
	Natural Forces	257	repairs	282	repairs	-25	-8.9%	1	repairs	4	repairs	-3	-75.0%	0	repairs	0	repairs	+0	0.0%	7	repairs	7	repairs	
	Excavation	65	repairs	73	repairs	-8	-11.0%	10	repairs	5	repairs	+5	100.0%	26	repairs	23	repairs	+3	13.0%	11	repairs	4	repairs	
	Other Outside Force	2	repairs	1	repairs	+1	100.0%	1	repairs	0	repairs	+1	NA	0	repairs	0	repairs	+0	NA	3	repairs	1	repairs	
	Material or Welds	6	repairs	19	repairs	-13	-68.4%	0	repairs	0	repairs	+0	NA	3	repairs	1	repairs	+2	200.0%	0	repairs	0	repairs	
	Equipment	447	repairs	307	repairs	+140	45.6%	27	repairs	22	repairs	+5	22.7%	7	repairs	7	repairs	+0	0.0%	33	repairs	23	repairs	
	Operations	5	repairs	0	repairs	+5	NA	0	repairs	0	repairs	+0	NA	0	repairs	0	repairs	+0	NA	5	repairs	0	repairs	
	Other	5067	repairs	3,054	repairs	+2013	65.9%	89	repairs	67	repairs	+22	32.8%	2	repairs	6	repairs	-4	NA	71	repairs	21	repairs	
Service Inventory	TOTAL MAIN LEAKS	6,917	repairs	4,456	repairs	+2461	55.2%	140	repairs	133	repairs	+7	5.3%	86	repairs	99	repairs	-13	-13.1%	186	repairs	87	repairs	
	Copper	8,534	svcs	8,828	svcs	-294	-3.3%	0	svcs	0	svcs	+0	0.0%	0	svcs	0	svcs	+0	NA	1	svcs	+0	svcs	
	Plastic	288,814	svcs	275,836	svcs	+12978	4.7%	33,103	svcs	32,496	svcs	+607	1.9%	86,137	svcs	83,688	svcs	+2449	2.9%	51,348	svcs	49,651	svcs	
	UP Bare Steel	78,900	svcs	82,762	svcs	-3862	-4.7%	3,650	svcs	3,798	svcs	-148	-3.9%	1,424	svcs	1,557	svcs	-133	-8.5%	1,538	svcs	1,681	svcs	
	UP Coated Steel	19,973	svcs	21,135	svcs	-1162	-5.5%	646	svcs	659	svcs	-13	-2.0%	1,893	svcs	2,065	svcs	-172	-8.3%	3,223	svcs	3,424	svcs	
	Total UP Steel	98,673	svcs	103,897	svcs	-5024	-4.8%	4,296	svcs	4,457	svcs	-161	-3.6%	3,317	svcs	3,622	svcs	-305	-8.4%	4,761	svcs	5,105	svcs	
	CP Bare Steel	0	svcs	0	svcs	+0	NA	0	svcs	0	svcs	+0	NA	0	svcs	0	svcs	+0	NA	0	svcs	+0	NA	
	CP Coated Steel	29,271	svcs	30,358	svcs	-1087	-3.6%	4,638	svcs	4,693	svcs	-55	-1.2%	18,178	svcs	19,065	svcs	-887	-4.7%	19,449	svcs	20,213	svcs	
	Total CP Steel	29,271	svcs	30,358	svcs	-1087	-3.6%	4,638	svcs	4,693	svcs	-55	-1.2%	18,178	svcs	19,065	svcs	-887	-4.7%	19,449	svcs	20,213	svcs	
	Other	80,045	svcs	84,056	svcs	-4011	-4.8%	10,059	svcs	7,419	svcs	+2640	35.6%	9,743	svcs	9,833	svcs	-90	-0.9%	1,966	svcs	+305	18.4%	
Service Leaks	Cast Iron / Wrought Iron	1,368	svcs	1,414	svcs	-46	-3.3%	4	svcs	4	svcs	+0	0.0%	15	svcs	16	svcs	-1	-6.3%	0	svcs	+0	NA	
	TOTAL SERVICES	506,905	svcs	504,389	svcs	+2516	0.5%	52,100	svcs	49,069	svcs	+3031	6.2%	117,390	svcs	116,224	svcs	+1166	1.0%	77,525	svcs	76,631	svcs	
	Corrosion	1,637	repairs	1,089	repairs	+540	50.3%	58	repairs	42	repairs	+16	38.1%	31	repairs	34	repairs	-3	-8.8%	74	repairs	52	repairs	
	Natural Forces	30	repairs	109	repairs	-79	-72.5%	1	repairs	0	repairs	+1	NA	0	repairs	2	repairs	-2	-100.0%	0	repairs	+0	NA	
	Excavation	297	repairs	366	repairs	-69	-18.9%	28	repairs	18	repairs	+10	55.6%	93	repairs	115	repairs	-22	-19.1%	51	repairs	39	repairs	
	Other Outside Force	16	repairs	16	repairs	+0	0.0%	0	repairs	0	repairs	+0	NA	1	repairs	0	repairs	+1	NA	0	repairs	2	repairs	
	Material or Welds	13	repairs	44	repairs	-31	-70.5%	3	repairs	0	repairs	+3	NA	3	repairs	0	repairs	+3	NA	0	repairs	1	repairs	
	Equipment	693	repairs	592	repairs	+101	17.1%	81	repairs	63	repairs	+18	28.6%	176	repairs	194	repairs	-18	-9.3%	102	repairs	99	repairs	
	Operations	1	repairs	3	repairs	-2	-66.7%	0	repairs	0	repairs	+0	NA	0	repairs	0	repairs	+0	NA	1	repairs	3	repairs	
	Other	166	repairs	396	repairs	-230	-58.1%	3	repairs	10	repairs	-7	-70.0%	17	repairs	5	repairs	+12	240.0%	4	repairs	5	repairs	
	TOTAL SVC LEAKS	2,853	repairs	2,615	repairs	+238	9.1%	174	repairs	133	repairs	+41	30.8%	321	repairs	350	repairs	-29	-8.3%	231	repairs	198	repairs	
Service Leaks Including Above Ground Leaks	Corrosion	1,637	repairs	1,089	repairs	+548	50.3%	58	repairs	42	repairs	+16	38.1%	31	repairs	34	repairs	-3	-8.8%	74	repairs	52	repairs	
	Natural Forces	30	repairs	109	repairs	-79	-72.5%	1	repairs	0	repairs	+1	NA	0	repairs	3	repairs	-3	-100.0%	0	repairs	+0	NA	
	Excavation	280	repairs	366	repairs	-86	-23.5%	28	repairs	18	repairs	+10	55.6%	93	repairs	115	repairs	-22	-19.1%	51	repairs	39	repairs	
	Other Outside Force	16	repairs	16	repairs	+0	0.0%	0	repairs	0	repairs	+0	NA	1	repairs	0	repairs	+1	NA	0	repairs	2	repairs	
	Material or Welds	13	repairs	44	repairs	-31	-70.5%	3	repairs	0	repairs	+3	NA	3	repairs	0	repairs	+3	NA	0	repairs	1	repairs	
	Equipment	696	repairs	598	repairs	+98	16.4%	83	repairs	63	repairs	+20	31.7%	182	repairs	204	repairs	-22	-10.8%	102	repairs	101	repairs	
	Operations	1	repairs	3	repairs	-2	-66.7%	0	repairs	0	repairs	+0	NA	0	repairs	0	repairs	+0	NA	1	repairs	0	repairs	
	Other	166	repairs	396	repairs	-230	-58.1%	3	repairs	10	repairs	-7	-70.0%	17	repairs	5	repairs	+12	240.0%	4	repairs	5	repairs	
	TOTAL SVC LEAKS	2,839	repairs	2,621	repairs	+218	8.3%	176	repairs	133	repairs	+43	32.3%	327	repairs	361	repairs	-34	-9.4%	231	repairs	200	repairs	
	Total Leak Repairs (Main & Service) Excluding Above Ground Leak	9,770	repairs	7,071	repairs	+2699	38.2%	314	repairs	266	repairs	+48	18.0%	407	repairs	449	repairs	-42	-9.4%	417	repairs	285	repairs	
Total Leak Repairs (Main & Service) Including Above Ground Leak	9,756	repairs	7,077	repairs	+2679	37.9%	316	repairs	266	repairs	+50	18.8%	413	repairs	460	repairs	-47	-10.2%	417	repairs	287	repairs		
	Workable Backlog As of 12/31	197	leaks	181	leaks	+16	8.8%	leaks	2	leaks	-2	NA	leaks	1	leaks	-1	NA	2	leaks	0	leaks	+2	NA	
UFG (Net)	4.3%		3.6%	0.005	13%	1.3%	1.0%	0.30%	30%	3.2%	2.7%	0.50%	19%	2.2%	0.4%	1.80%	450%	4.0%	3.20%	100%	4.0%	25%		
Average Service Length (ft)	46.8	ft	46.3	ft	+0.54	1.2%	71.6	ft	75.5	ft	-3.9	-5.2%	76.0	ft	75.6	ft	+0.38	0.5%	71.8	ft	71.8	ft	+0.25	0.5%

2017 SYSTEM INTEGRITY REPORT

	General Data Correction Explanation Needed Discussed & Approved							
2016 - 2017 DOT Comparisons	RI				US - NGRID (ALL REGIONS COMBINED)			
	2017	2016	Delta(17-16)	%	2017	2016	Delta(16-15)	%
Main Inventory	Cast Iron	730 miles	754 miles	-24	-3%	4,681 miles	4,902 miles	-220,499 -4%
	Reconditioned Cast Iron	0 miles	0 miles	0	N/A	7 miles	5 miles	2,667 N/A
	Plastic	1,476 miles	1,417 miles	+59	4%	16,638 miles	16,031 miles	+606,902 4%
	UP Bare Steel	224 miles	242 miles	-18	-7%	3,541 miles	3,688 miles	-147,026 -4%
	UP Coated Steel	171 miles	175 miles	-4	-2%	1,623 miles	1,657 miles	-33,989 -2%
	Total UP Steel	395 miles	416 miles	-22	-5%	5,163 miles	5,344 miles	-181,015 -3%
	CP Bare Steel	0 miles	0 miles	+0	0%	183 miles	185 miles	-1,859 -1%
	CP Coated Steel	590 miles	590 miles	-0.49	-0.1%	8,730 miles	8,784 miles	-53,633 -0.6%
	Total CP Steel	590 miles	590 miles	0	0%	8,913 miles	8,969 miles	-55,492 -1%
	Other	0 miles	0 miles	-0.01	0%	0 miles	0 miles	-0.006 -9%
Main Leaks	Ductile Iron	16 miles	16 miles	-0.3	-2%	16 miles	16 miles	-0.304 -2%
	TOTAL MAIN	3,205 miles	3,193 miles	+12	0.4%	35,419 miles	35,266 miles	+152,253 0.4%
	Corrosion	102 repairs	85 repairs	+17	20%	2,110 repairs	1,828 repairs	+282 15%
	Natural Forces	26 repairs	40 repairs	-14	-35%	555 repairs	593 repairs	-38 -6%
	Excavation	16 repairs	16 repairs	+0	0%	275 repairs	289 repairs	-14 -5%
	Other Outside Force	1 repairs	0 repairs	+1	#DIV/0!	21 repairs	16 repairs	+5 31%
	Material or Welds	0 repairs	2 repairs	-2	-100%	50 repairs	69 repairs	-19 -28%
	Equipment	58 repairs	46 repairs	+12	26%	979 repairs	992 repairs	-13 -1%
	Operations	0 repairs	0 repairs	+0	0%	11 repairs	1 repairs	+10 1000%
	Other	666 repairs	562 repairs	+104	19%	9,055 repairs	6,912 repairs	+2143 31%
Service Inventory	TOTAL MAIN LEAKS	869 repairs	751 repairs	+118	16%	13,056 repairs	10,700 repairs	+2356 22%
	Copper	192 svcs	201 svcs	-9	-4%	140,021 svcs	145,795 svcs	-5774 -4%
	Plastic	142,956 svcs	140,206 svcs	+2750	2%	1,835,019 svcs	1,790,472 svcs	+44547 2%
	UP Bare Steel	34,701 svcs	36,227 svcs	-1526	-4%	206,726 svcs	216,765 svcs	-10039 -5%
	UP Coated Steel	8,268 svcs	8,579 svcs	-311	-4%	176,510 svcs	185,496 svcs	-8986 -5%
	Total UP Steel	42,969 svcs	44,806 svcs	-1837	-4%	383,236 svcs	402,261 svcs	-19025 -5%
	CP Bare Steel	0 svcs	0 svcs	+0	0%	12,743 svcs	13,001 svcs	-258 -2%
	CP Coated Steel	9,456 svcs	9,585 svcs	-129	-1%	154,542 svcs	157,997 svcs	-3455 -2%
	Total CP Steel	9,456 svcs	9,585 svcs	-129	-1%	167,285 svcs	170,998 svcs	-3713 -2%
	Other	803 svcs	854 svcs	-51	-6%	102,616 svcs	103,823 svcs	-1207 -1%
Service Leaks Excluding Above Ground Leaks	Cast Iron / Wrought Iron	129 svcs	134 svcs	-5	-4%	1,933 svcs	2,430 svcs	-497 -20%
	TOTAL SERVICES	196,505 svcs	195,786 svcs	+719	0.4%	2,630,110 svcs	2,615,779 svcs	+14331 0.5%
	Corrosion	460 repairs	396 repairs	+64	16%	3,691 repairs	3,040 repairs	+651 21%
	Natural Forces	2 repairs	1 repairs	+1	100%	111 repairs	189 repairs	-78 -41%
	Excavation	101 repairs	91 repairs	+10	11%	1,470 repairs	1,564 repairs	-94 -6%
	Other Outside Force	10 repairs	10 repairs	+0	0%	106 repairs	125 repairs	-19 -15%
	Material or Welds	2 repairs	2 repairs	+0	0%	68 repairs	102 repairs	-34 -33%
	Equipment	74 repairs	96 repairs	-22	-23%	2,661 repairs	2,600 repairs	+61 2%
	Operations	0 repairs	0 repairs	+0	0%	10 repairs	4 repairs	+6 150%
	Other	5 repairs	5 repairs	+0	0%	243 repairs	551 repairs	-308 -56%
Service Leaks Including Above Ground Leaks	TOTAL SVC LEAKS	654 repairs	601 repairs	+53	9%	8,360 repairs	8,175 repairs	+185 2%
	Corrosion	460 repairs	396 repairs	+64	16%	3,692 repairs	3,041 repairs	+651 21%
	Natural Forces	2 repairs	1 repairs	+1	100%	115 repairs	193 repairs	-78 -40%
	Excavation	101 repairs	95 repairs	+6	6%	1,453 repairs	1,588 repairs	-135 -9%
	Other Outside Force	13 repairs	10 repairs	+3	30%	127 repairs	126 repairs	+1 1%
	Material or Welds	2 repairs	2 repairs	+0	0%	71 repairs	102 repairs	-31 -30%
	Equipment	74 repairs	96 repairs	-22	-23%	2,674 repairs	2,631 repairs	+43 2%
	Operations	0 repairs	0 repairs	+0	0%	10 repairs	4 repairs	+6 150%
	Other	5 repairs	5 repairs	+0	0%	259 repairs	551 repairs	-292 -53%
	TOTAL SVC LEAKS	657 repairs	605 repairs	+52	9%	8,401 repairs	8,236 repairs	+165 2%
Total Leak Repairs (Main & Service)		1,523 repairs	1,352 repairs	+171	13%	21,416 repairs	18,875 repairs	+2541 13%
Excluding Above Ground Leak								
Total Leak Repairs (Main & Service)		1,526 repairs	1,356 repairs	+170	13%	21,457 repairs	18,936 repairs	+2521 13%
Including Above Ground Leak								
Workable Backlog As of 12/31		74 leaks	68 leaks	+6	9%	289 leaks	296 leaks	-7 -2%
UFG (Net)		2.2%	1.8%	0	22%	2.6%	2.39%	0.2100% 9%
Average Service Length (Ft)		66.5 ft	66.0 ft	+0.49	1%	59.8 ft	59.7 ft	+0.091 0%

2017 SYSTEM INTEGRITY REPORT

NATIONAL GRID-US 2017 GAS DISTRIBUTION SYSTEM STATISTICS



2017 SYSTEM INTEGRITY REPORT

2017 GAS DISTRIBUTION SYSTEM STATISTICS

STATE	LEGACY	2017 PIPELINE / CUSTOMER / SENDOUT STATISTICS								
		Miles of Main	# of Services	Avg Service Length (ft/svc)	Miles of Services	TOTAL Distribution Pipeline	Residential Customers	Commercial and Industrial Customers	TOTAL Customers	Sendout (MDT)
NEW YORK STATE	NYC	4,141	568,846	45	4,848	8,989	1,189,385	72,689	1,262,074	201,774
	LI	8,184	546,925	65	6,733	14,917	532,730	61,617	594,347	99,894
	UPSTATE	8,783	563,914	73	7,786	16,569	568,454	47,061	615,515	121,345
ALL NEW YORK STATE		21,108	1,679,685	60.9	19,367	40,475	2,290,569	181,367	2,471,936	423,013
MASSACHUSETTS	BOSTON	6,367	506,905	46.8	4,493	10,860	599,180	54,143	653,323	112,863
	ESSEX	866	52,100	71.6	707	1,573	49,332	5,118	54,450	6,953
	CAPE	2,475	117,390	76.0	1,690	4,165	105,467	9,722	115,189	11,631
	LOWELL	1,397	77,525	71.8	1,054	2,451	84,511	9,436	93,947	14,494
ALL MASSACHUSETTS		11,105	753,920	55.6	7,943	19,048	838,490	78,419	916,909	145,941
RHODE ISLAND		3,205	196,505	66.5	2,475	5,680	241,126	25,048	266,174	41,489
TOTAL NGRID-US		35,418	2,630,110	59.8	29,785	65,203	3,370,185	284,834	3,655,019	610,443

CAUTION:

This chart is for comparative-illustrative purposes only. The data is not audited & many assumption have been made.

Inventory data is from the Annual DOT/PHMSA Distribution Reports.

Customer data is from the Gas Customer Data base- Active Gas Accounts

Sendout data is from the sendouts for the 12-month period used to calculate UFG for the DOT Reports.

2017 SYSTEM INTEGRITY REPORT

2017 GAS DISTRIBUTION SYSTEM STATISTICS

STATE	LEGACY	PERCENTAGES OF NGRID-US SYSTEM					ASSET RATIOS			GAS CONSUMPTION RATIOS			
		% of Main	% of Service s	% of Distribu-tion Pipeline	% of Custo-mers	% of Sendout	Service Density (Svcs / Mile Main)	Meter Density (Custo-mers / Service)	Customer Density (Customers / Mile Total Pipeline)	Main Capacities Used (Sendout MDT / Mile Main)	Service Capacities Used (Sendout MDT/ Service)	Pipeline Capacities Used (Sendout MDT / Mile Total Pipe)	Customer Usage (Sendout MDT / Customer)
	NYC	11.7%	21.6%	13.8%	34.5%	33.1%	137	2.2	140.4	48.73	0.35	22.45	0.160
	LI	23.1%	20.8%	22.9%	16.3%	16.4%	67	1.1	39.8	12.21	0.18	6.70	0.168
	UPSTATE	24.8%	21.4%	25.4%	16.8%	19.9%	64	1.1	37.1	13.82	0.22	7.32	0.197
ALL NEW YORK STATE		59.6%	63.9%	62.1%	67.6%	69.3%	80	1.5	61.1	20.04	0.25	10.45	0.171
	BOSTON	18.0%	19.3%	16.7%	17.9%	18.5%	80	1.3	60.2	17.73	0.22	10.39	0.173
	ESSEX	2.4%	2.0%	2.4%	1.5%	1.1%	60	1.0	34.6	8.03	0.13	4.42	0.128
	CAPE	7.0%	4.5%	6.4%	3.2%	1.9%	47	1.0	27.7	4.70	0.10	2.79	0.101
	LOWELL	3.9%	2.9%	3.8%	2.6%	2.4%	55	1.2	38.3	10.38	0.19	5.91	0.154
ALL MASSACHUSETTS		31.4%	28.7%	29.2%	25.1%	23.9%	68	1.2	48.1	13.14	0.19	7.66	0.159
RHODE ISLAND		9.0%	7.5%	8.7%	7.3%	6.8%	61	1.4	46.9	12.95	0.21	7.30	0.156
TOTAL NGRID-US		100%	100%	100%	100%	100%	74	1.4	56.1	17.24	0.23	9.36	0.167

2017 SYSTEM INTEGRITY REPORT

SEPARATE LEAK-PRONE PIPE ANALYSIS

STATE	LEGACY	2017 LEAK-PRONE PIPE INVENTORY					LEAK-PRONE PIPE %'s			
		Leak - Prone Main (miles)	% of TOTAL Main	Leak - Prone Services (#)	% of TOTAL Services	Miles of Leak - Prone Services	TOTAL Leak - Prone Pipe (in miles)	% of NG-US Leak - Prone Main (miles)	% of NG-US Leak - Prone Services (#)	% of NG-US Leak - Prone Pipe
	NYC	1,681	40.6%	137,961	24.3%	1,176	2,857	17.1%	26.3%	18.2%
	LI	3,274	40.0%	82,291	15.0%	1,013	4,287	33.2%	15.7%	27.4%
	UPSTATE	618	7.0%	140,062	24.8%	1,934	2,552	6.3%	26.7%	16.3%
ALL NEW YORK STATE		5,573	26.4%	360,314	21.5%	4,123	9,696	56.6%	68.7%	61.9%
	BOSTON	2,860	44.9%	108,775	21.5%	964	3,824	29.0%	20.7%	24.4%
	ESSEX	91	10.5%	4,300	8.3%	58	149	0.9%	0.8%	1.0%
	CAPE	48	1.9%	3,332	2.8%	48	96	0.5%	0.6%	0.6%
	LOWELL	156	11.2%	4,762	6.1%	65	221	1.6%	0.9%	1.4%
ALL MASSACHUSETTS		3,155	28.4%	121,169	16.1%	1,135	4,290	32.0%	23.1%	27.4%
RHODE ISLAND		1,124	35.1%	43,290	22.0%	545	1,669	11.4%	8.2%	10.7%
TOTAL NGRID-US		9,852	27.8%	524,773	20.0%	5,803	15,655	100%	100%	100%

NOTES:

Leak-Prone Main includes Cast Iron/Wrought Iron, Unprotected Steel , Aldyl-A and Other Material.

Leak-Prone Service includes Cast Iron/Wrought Iron, Copper and Unprotected Steel.

2017 SYSTEM INTEGRITY REPORT

LEAK AND REPAIR ANALYSIS

STATE	LEGACY	2017 LEAK DATA				LEAK RATE RATIOS					
		TOTAL Leak Receipts (Main & Service)	TOTAL Leak Repairs (Main & Service)	Year-End Workable Leak Backlog	TOTAL Repairs + Workable Leaks	TOTAL Leak Receipts / Mile TOTAL Pipe	TOTAL Leak Repairs / Mile Leak- Prone Pipe	TOTAL Leak Receipts / Mile TOTAL Pipe	TOTAL Leak Repairs / Mile Leak- Prone Pipe	Repairs + Workables / Mile TOTAL Pipe	Repairs + Workable / Mile Leak- Prone Pipe
	NYC	4,075	4,650	8	4,658	0.5	1.4	0.5	1.6	0.5	1.6
	LI	3,292	2,925	-	2,925	0.2	0.8	0.2	0.7	0.2	0.7
	UPSTATE	1,633	1,454	9	1,463	0.1	0.6	0.1	0.6	0.1	0.6
ALL NEW YORK STATE		9,000	9,029	17	9,046	0.2	0.9	0.2	0.9	0.2	0.9
	BOSTON	7,018	9,756	193	9,949	0.6	1.8	0.9	2.6	0.9	2.6
	ESSEX	233	314	1	315	0.1	1.6	0.2	2.1	0.2	2.1
	CAPE	325	407	1	408	0.1	3.4	0.1	4.2	0.1	4.3
	LOWELL	329	417	-	417	0.1	1.5	0.2	1.9	0.2	1.9
ALL MASSACHUSETTS		7,905	10,894	195	11,089	0.4	1.8	0.6	2.5	0.6	2.6
RHODE ISLAND		1,924	1,523	74	1,597	0.3	1.2	0.3	0.9	0.3	1.0
TOTAL NGRID-US		18,829	21,446	286	21,732	0.3	1.2	0.3	1.4	0.3	1.4

NOTES:

TOTAL Leak Receipts (Main & Service) data excludes Excavation Leaks.

TOTAL Leak Repairs (Main & Service) data includes Excavation Leaks.

TOTAL Leak Repairs (Main & Service) data excludes Above Ground Leaks.

2017 SYSTEM INTEGRITY REPORT

2017 SYSTEM INTEGRITY REPORT ANALYSIS (FINDINGS AND EXPLANATIONS)



2017 SYSTEM INTEGRITY REPORT

ANALYSIS OF FINDINGS AND EXPLANATIONS

FINDING 1:

NYC

Leak receipts have declined by 6% (265) in 2017 compared to 2016.

MAIN - Main leak repairs increased by 2% (64) in 2017 compared to 2016. Cast Iron Joint leaks comprise 86% of all main leaks.

SERVICE – Service leak repairs increased by 10% (130) in 2017 compared to 2016. Equipment leaks comprise 55% of all service leaks.

Total – Gas leak repairs increased by 4% (194) in 2017

LI

Leak receipts have declined by 3% (88) in 2017 compared to 2016

MAIN - Main leak repairs decreased by 16% (207) in 2017 compared to 2016. Corrosion leaks comprise 52% of all main leaks.

SERVICE - Service leak repairs decreased by 6% (109) in 2017 compared to 2016. Corrosion leaks comprise 45% of all service leaks.

Total – Gas leak repairs decreased by 10% (316) in 2017

UPSTATE

Leak receipts have declined by 0% (6) in 2017 compared to 2016

MAIN – Main leak repairs decreased by 25% (172) in 2017. Cast Iron Joint leaks comprise 52% of all main leaks.

SERVICE - Service leak repairs decreased by 12% (127). Corrosion leaks comprise 35% of all service leaks.

Total – Gas leak repairs decreased by 17% (299) in 2017

2017 SYSTEM INTEGRITY REPORT

ANALYSIS OF FINDINGS AND EXPLANATIONS

FINDING 2:

BGC

MAIN- Leak receipts have increased by 15% in 2017 compared to 2016, and the total Leak Repairs have increased by 42%.

SERVICE- Leak rates increased by 8% compared to 2016 leak rate. Corrosion leaks increased by 50% of all service leaks.

CCC

MAIN- Leak receipts have declined by 4% in 2017 compared to 2016, and the total Leak Repairs have decreased by 9%.

SERVICE- Leak rates decreased by 9% compared to 2016 leak rate. Equipment leaks comprise 9% of all service leaks.

CLW

MAIN- Leak receipts have increased by 9% in 2017 compared to 2016, and the total Leak Repairs have increased by 47%.

SERVICE- Leak rates increased by 15% compared to 2016 leak rate. Equipment leaks increased by 3% of all service leaks.

EGC

MAIN- Leak receipts have declined by 10% in 2017 compared to 2016, but the total Leak Repairs have been increased by 14%.

SERVICE- Leak rates increased by 24% compared to 2016 leak rate. Equipment leaks increased by 28% of all service leaks.

2017 SYSTEM INTEGRITY REPORT

ANALYSIS OF FINDINGS AND EXPLANATIONS

MA experienced significant increase of leak receipts and repairs. GDE has been closely monitoring this matter since Sept 2017.

Inventory data shows a great reduction in CI and Un-protected Steel from 2016 to 2017.

MA experienced significant amount of Protected Coated steel main inventory reduction from 2013 to 2017.

In MA, from 2013 to 2017 data shows a significant decrease in cathodically protected coated steel main for the following reasons:

1. Protected main has been replaced due to municipality work, size increase or PSI
2. Protected pipe that is 1940-1960's vintage and doesn't have maintained CP, gets replaced through GSEP
3. Protected pipe that over time has interference issues with water or other utilities (has typically been Pre-DOT piping), we backed off CP on 2 systems in Acton in 2014
4. Mislabeled ArcFM data has gotten corrected. Typically the issues that are found and corrected are changes in material, coating or CP
5. The Pre-DOT program in MA has been on hold for a few years now, so we are not adding CP to unprotected CS.

Gas Distribution engineering will continue to monitor and coordinate this issue with Corrosion, Main & Service Replacement and mapping groups.

2017 SYSTEM INTEGRITY REPORT

ANALYSIS OF FINDINGS AND EXPLANATIONS

Follow up work on Riser Leak monitoring/analysis in Colonial Gas Cape.

Gas Distribution Engineering has monitored and analyzed the last six years of data of equipment leaks in Colonial Gas Cape. The total number of riser leaks has stayed consistent.

Gas Distribution Engineering has also analyzed the geographical locations of riser leaks for the last six years. The map below gives a good visual indication of how heavily concentrated in certain areas on the south shore of the Cape. This is due to the higher corrosivity of the soil.

Equipment Repair Breakdown by Material – Colonial Cape

	PL						CS						Other (BS/WI/CU/Unknown)						Total								
	Comment	2017	2016	2015	2014	2013	2012	Comment	2017	2016	2015	2014	2013	2012	Comment	2017	2016	2015	2014	2013	2012	Comment	2017	2016	2015	2014	2013
Riser Leak	61	98	60	53	30	36	32	40	30	40	32	38	4	4	4	6	8	19	97	142	94	99	70	93			
Other	51	20	45	29	36	13	28	36	34	61	48	12	7	3	7	16	9	21	86	59	86	106	93	46			
Total	112	118	105	82	66	49	60	76	64	101	80	50	11	7	11	22	17	40	183	201	180	205	163	139			

Riser Leak Location Overview 2012 to 2017

Legend

Year

- 2012
- 2013
- 2014
- 2015
- 2016
- 2017



2017 SYSTEM INTEGRITY REPORT

ANALYSIS OF FINDINGS AND EXPLANATIONS

FINDING 2:

RI

Total leak receipts have increased by 25% in 2017 compared to 2016, and the total Leak Repairs increased by 13%.

MAIN- Leak repairs have increased by 16% in 2017 compared to 2016. Total Cast Iron break reduced by 33%.

SERVICE- Leak repairs have increased by 9% compared to 2016. Type 1 leak repair increased by 10%, and the number of Type 3 repairs increased by over three times.

2017 SYSTEM INTEGRITY REPORT

LPP Replacement Projection

NYS - Leak Prone Pipe Replacement

		CY12	CY13	CY14	CY15	CY16	CY17	2017 LPP	CY18	CY19	CY20	CY21	CY22	CY23	CY24	CY25	CY26	CY27	CY28	CY29	CY30	CY31	CY32	CY33	CY34	
KEDNY	All Programs	26	42	43	41	48	57	1,680	58.6	65	70	75	80	84	89	92	95	99	104	110	117	125	134	141.4	141	
	Proactive	3	16	18	15	18	22		25.6	32	37	44	49	56	61	66	72	79	86	94	103	113	124	136	140	
KEDLI	All Programs	51	54	52	80	96	115.9	3,663	135	155	175	195	215	219	221	222	224	225	227	230	234	238	244	250	254	
	Proactive	38	36	40	72	87	108		127	145.5	167	187	207	212	213	218	220	222	225	229	233	238	244	250	254.0	
NIMO	All Programs	28	40	42	39	46	53.8	618	50	51	51	52	52	52	52	52	52	52	51	51						
	Proactive	25	37	38	34	41	48		46	48	48	49	49	49	49	49	49	49	49	49	49					
NY STATE	All Programs	105	136	136	160	190	226.8	5,961	244	271	296	322	347	355	362	366	371	376	382	391	351	363	378	391	395	
	Proactive	67.0	89.1	95.2	121.2	146.0	177.2		199	226	252	280	305	317	323	333	341	350	360	372	336	351	368	386	394	

*Projected

NE - Leak Prone Pipe Replacement

		CY12	CY13	CY14	CY15	CY16	CY17	2017 LPP	CY18	CY19	CY20	CY21	CY22	CY23	CY24	CY25	CY26	CY27	CY28	CY29	CY30	CY31	CY32	CY33	CY34	
BGC	All Programs	109.4	95.8	110.0	101.1	123.8	121.2	2,946	115	120	123	126	129	132	135	138	145	150	155	165	175	175	166	160	155	
	Proactive	75.8	69.1	54.8	40.2	61.4	63.6		56	59.0	60.0	63.0	64.5	66.0	69.0	70.0	75	80	85	95	110	115	115	115	115	
CLC	All Programs	63.2	42.6	48.6	39.6	38.2	44.7	203	40	34	28	25	20	20	18	18										
	Proactive	60.6	40.3	45.8	33.7	33.7	39.5		36	30	25	23	19	19	18	18										
MA	All Programs	172.6	138.4	158.6	140.7	162.0	165.9	3,149	155	154	151	151	149	152	153	156	145	150	155	165	175	175	166	160	155	
	Proactive	136.4	109.4	100.6	73.9	95.1	103.1		92	89	85	86	84	66	69	70	75	80	85	95	110	115	115	115	115	115
RI	All Programs	54.3	44.0	28.8	56.0	62.7	63.3	1,140	60	65	65	65	65	65	69	69	69	69	69	69	69	69	69	69	69	69
	Proactive	50.0	39.9	23.0	50.3	51.0	48.3		50	49.7	49.7	49.7	49.7	53.0	54	59	59	59	60	61	61	62	62	63	63	
NE	All Programs	226.9	182.4	187.4	196.7	224.7	229.2	3,807	215	219	216	216	214	217	218	225	214	219	224	234	244	244	235	229	224	
	Proactive	186.4	149.3	123.6	124.2	146.1	151.4		142	139	135	136	133	138	141	147	134	139	145	156	171	177	178	178	178	

*Projected

2017 SYSTEM INTEGRITY REPORT

Cast Iron/Unprotected Steel Ratio

NYS - Cast Iron / Unprotected Steel					
Calendar Years		2014	2015	2016	2017
KEDNY	Cast Iron	39.6	37.8	37.8	51.1
	Unp. Steel	3.2	3.3	10.7	5.7
KEDLI	Cast Iron	10.3	19.0	8.7	22.8
	Unp. Steel	41.2	61.2	87.6	93.1
NMPC	Cast Iron	39.6	37.7	44.1	47.2
	Unp. Steel	2.4	1.2	1.4	6.6
NYS	Cast Iron	89.5	94.5	90.6	121.1
	Unp. Steel	46.8	65.7	99.7	105.4

NE - Cast Iron / Unprotected Steel					
Calendar Years		2014	2015	2016	2017
BGC	Cast Iron	67.1	69.1	53.6	64.4
	Unp. Steel	42.9	32.0	70.2	59.3
CLC	Cast Iron	10.1	5.4	3.4	4.6
	Unp. Steel	38.5	34.2	34.8	41.6
MA	Cast Iron	77.2	74.5	56.9	69.0
	Unp. Steel	81.4	66.2	105.0	100.9
RI	Cast Iron	20.1	29.4	19.8	24.7
	Unp. Steel	8.7	39.5	41.0	28.5

2017 SYSTEM INTEGRITY REPORT

APPENDICES

2017 SYSTEM INTEGRITY REPORT

2017 LEAK RECEIPTS AS A FUNCTION OF TOTAL SYSTEM PIPE MILEAGE

NYC

4,075 Leak Receipts

4,141 miles of Main
568,846 #'s of Services
(4,848 miles)

8,989 total miles of pipe

*0.45 Leak Receipts
per Mile of Pipe*

LI

3,292 Leak Receipts

8,184 miles of Main
546,925 #'s of Services
(6,733 miles)

14,917 total miles of pipe

*0.22 Leak Receipts
per Mile of Pipe*

Upstate

1,633 Leak Receipts

8,783 miles of Main
563,914 #'s of Services
(7,786 miles)

16,569 total miles of pipe

*0.10 Leak Receipts
per Mile of Pipe*

NY State

9,000 Leak Receipts

21,108 miles of Main
1,679,685 #'s of Services
(19,374 miles)

40,482 total miles of pipe

*0.22 Leak Receipts
per Mile of Pipe*

2017 SYSTEM INTEGRITY REPORT

2017 LEAK RECEIPTS AS A FUNCTION OF TOTAL SYSTEM PIPE MILEAGE

BGC

7,018 Leak Receipts

6,367 miles of Main

506,905 #'s of Services
(4,493 miles)

10,860 total miles of pipe

0.65 Leak Receipts per Mile of Pipe

EGC

233 Leak Receipts

866 miles of Main

52,100 #'s of Services
(707 miles)

1,573 total miles of pipe

0.15 Leak Receipts per Mile of Pipe

CAPE

325 Leak Receipts

2,475 miles of Main

117,390 #'s of Services
(1,690 miles)

4,165 total miles of pipe

0.08 Leak Receipts per Mile of Pipe

LOWELL

329 Leak Receipts

1,397 miles of Main

77,525 #'s of Services
(1,054 miles)

2,451 total miles of pipe

0.13 Leak Receipts per Mile of Pipe

MA

7,905 Leak Receipts

11,105 miles of Main

753,920 #'s of Services
(7,939 miles)

19,044 total miles of pipe

0.42 Leak Receipts per Mile of Pipe

2017 SYSTEM INTEGRITY REPORT

2017 LEAK RECEIPTS AS A FUNCTION OF TOTAL SYSTEM PIPE MILEAGE

NY State

9,000 Leak Receipts

21,108 miles of Main
1,679,685 #'s of Services
(19,374 miles)

40,482 total miles of pipe

*0.22 Leak Receipts
per Mile of Pipe*

MA State

7,905 Leak Receipts

11,105 miles of Main
753,920 #'s of Services
(7,939 miles)

19,044 total miles of
pipe

*0.42 Leak Receipts
per Mile of Pipe*

RI

1,924 Leak Receipts

3,205 miles of Main
196,505 #'s of Services
(2,754 miles)

5,959 total miles of
pipe

*0.29 Leak Receipts
per Mile of Pipe*

US-NGrid

18,607 Leak Receipts

35,418 miles of Main
2,630,110 #'s of Services
(30,067 miles)

65,485 total miles of pipe

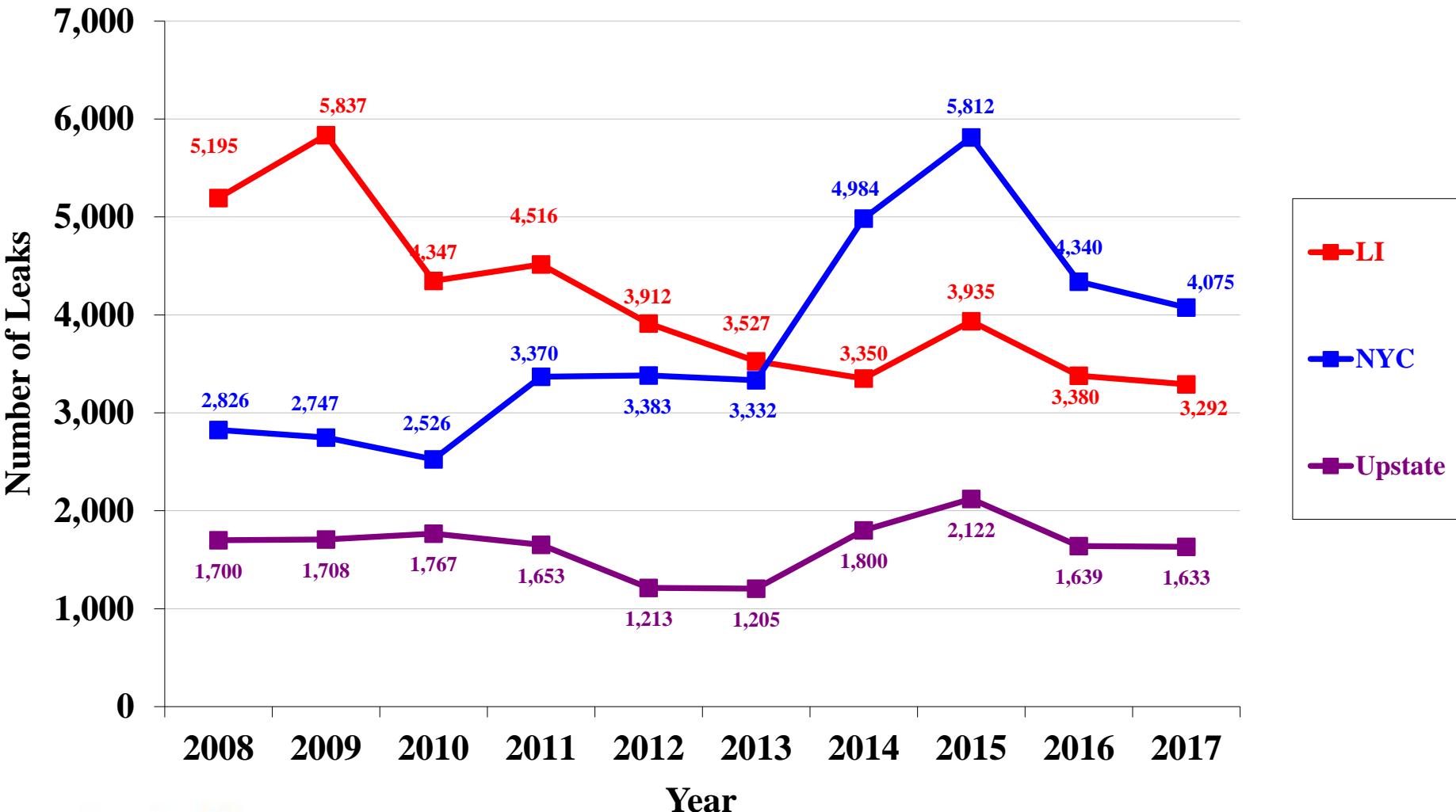
*0.28 Leak Receipts
per Mile of Pipe*

2017 SYSTEM INTEGRITY REPORT

NYS

TOTAL LEAK RECEIPTS

INCLUDES ALL TYPE 1, 2A, 2 and 3 LEAKS DISCOVERED - EXCLUDING DAMAGES

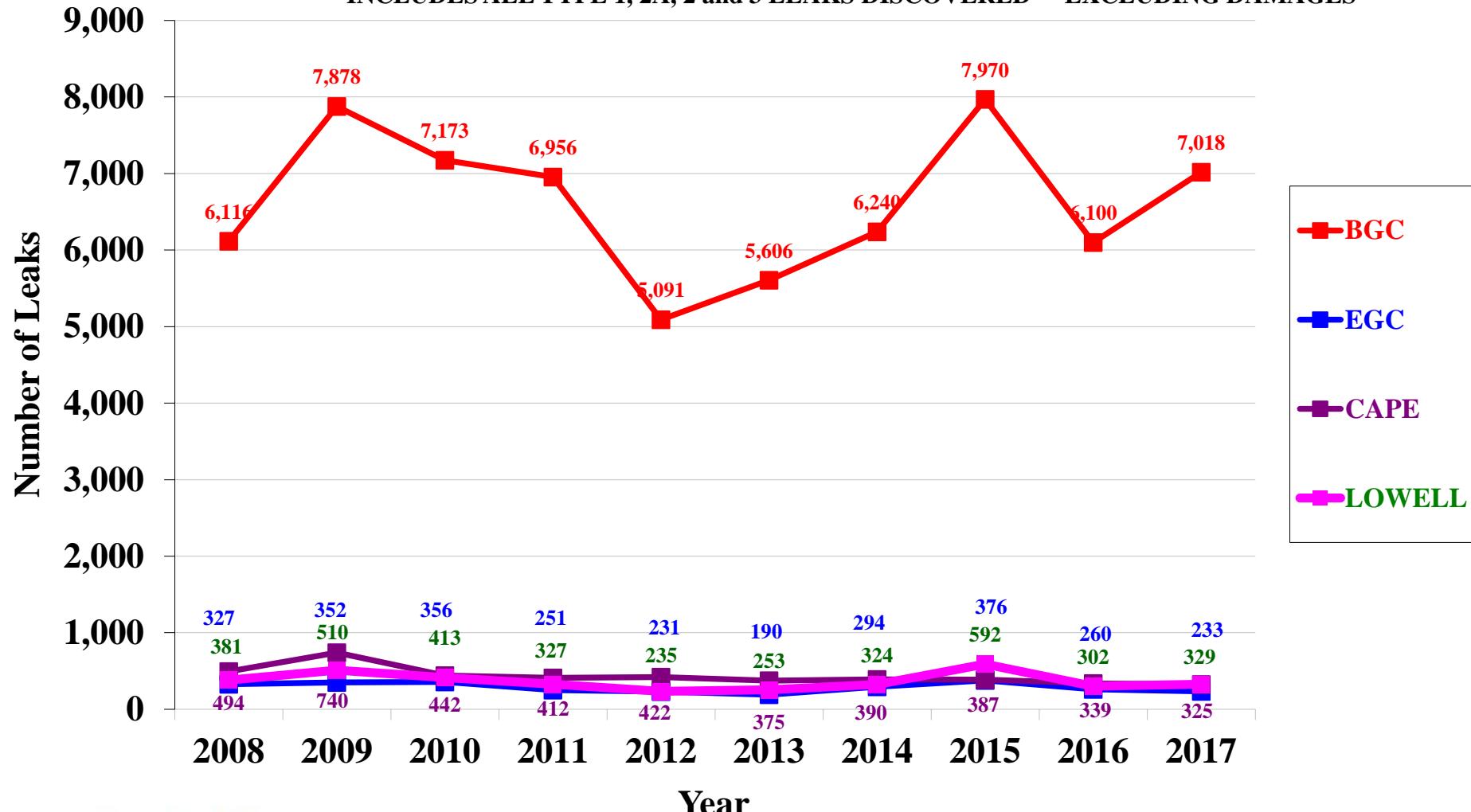


2017 SYSTEM INTEGRITY REPORT

MA

TOTAL LEAK RECEIPTS

INCLUDES ALL TYPE 1, 2A, 2 and 3 LEAKS DISCOVERED - EXCLUDING DAMAGES

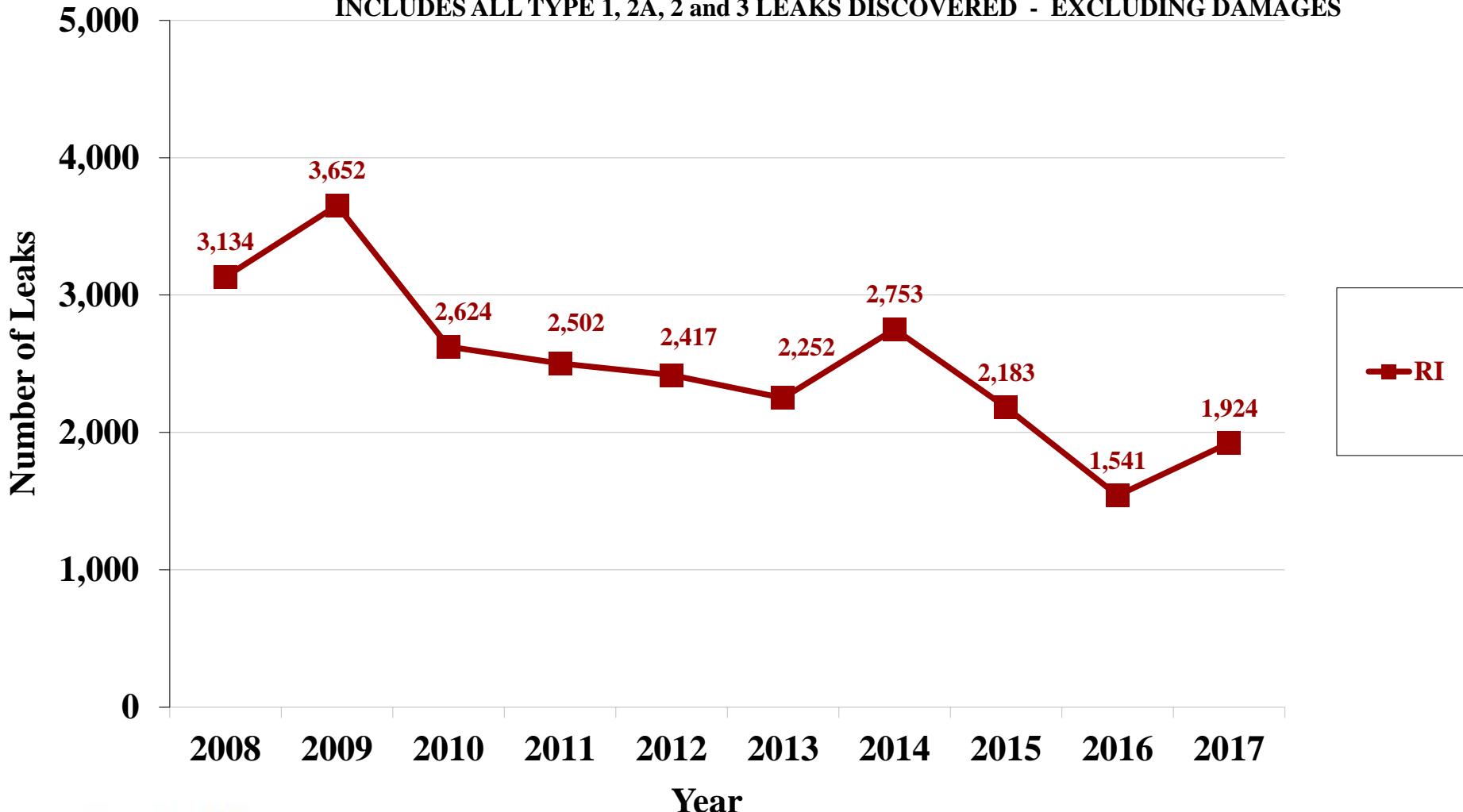


2017 SYSTEM INTEGRITY REPORT

RI

TOTAL LEAK RECEIPTS

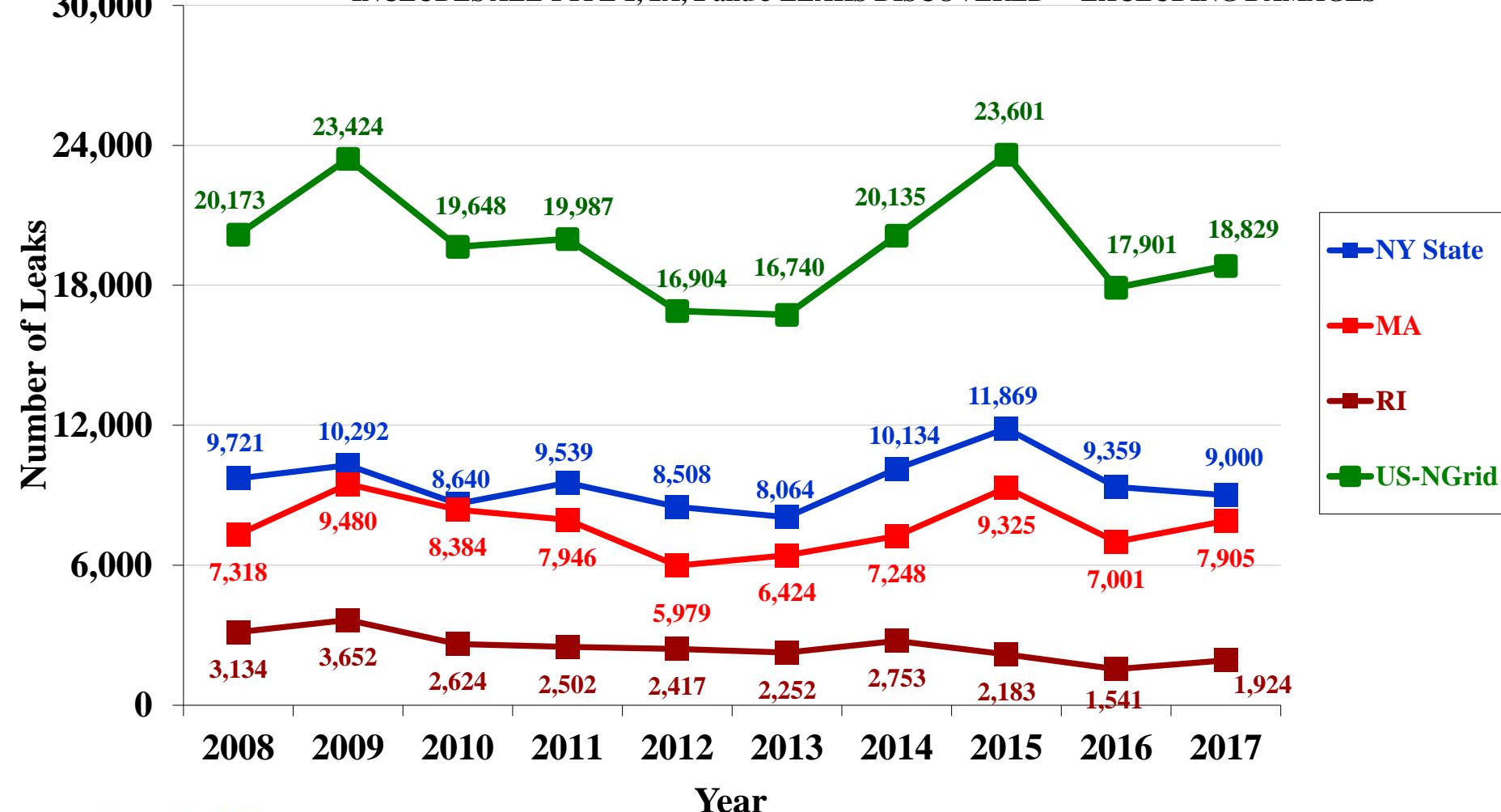
INCLUDES ALL TYPE 1, 2A, 2 and 3 LEAKS DISCOVERED - EXCLUDING DAMAGES



2017 SYSTEM INTEGRITY REPORT

TOTAL LEAK RECEIPTS

INCLUDES ALL TYPE 1, 2A, 2 and 3 LEAKS DISCOVERED - EXCLUDING DAMAGES

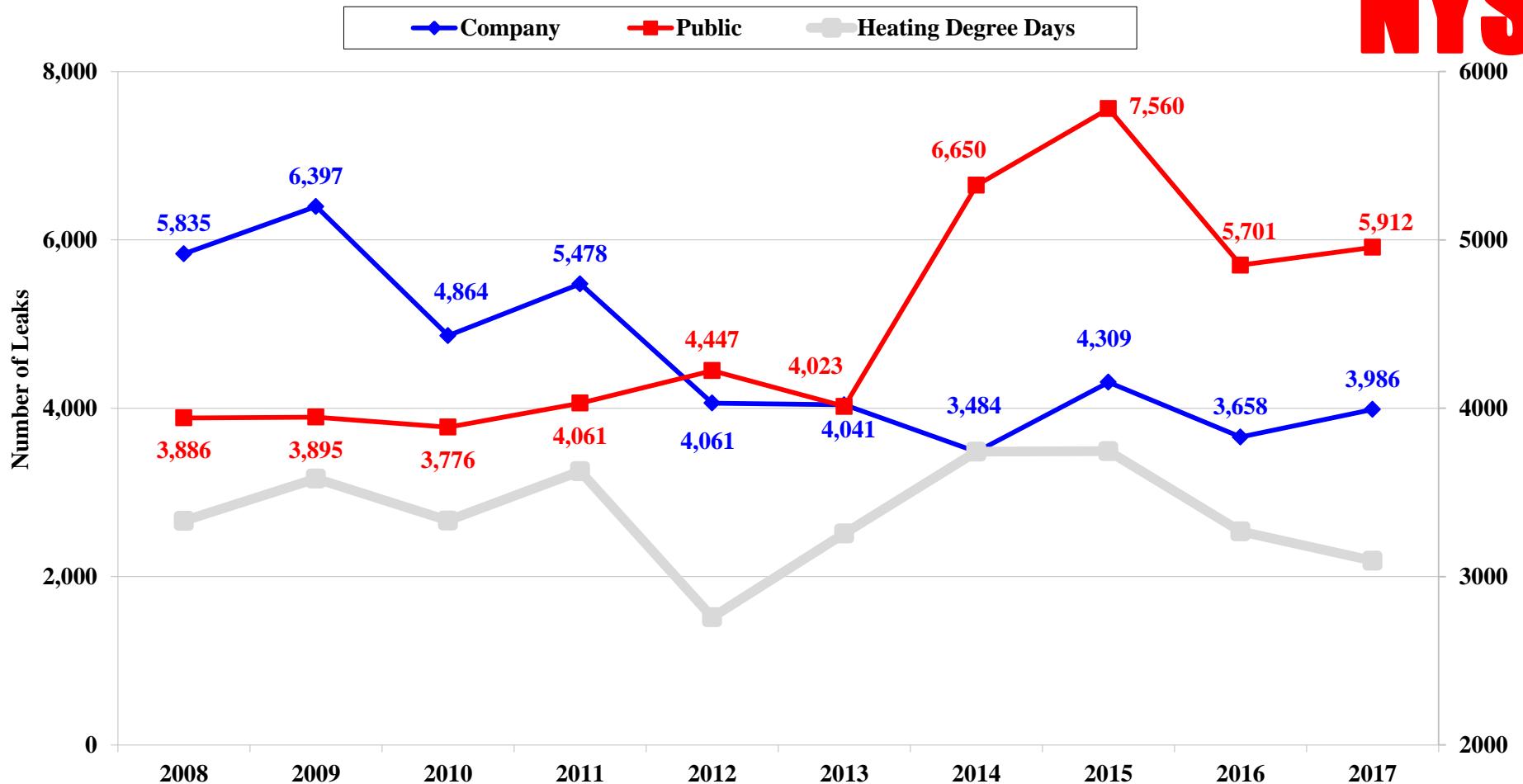


2017 SYSTEM INTEGRITY REPORT

2008 - 2017 LEAK RECEIPTS

By Discovery Source (Excluding damages)

NYS

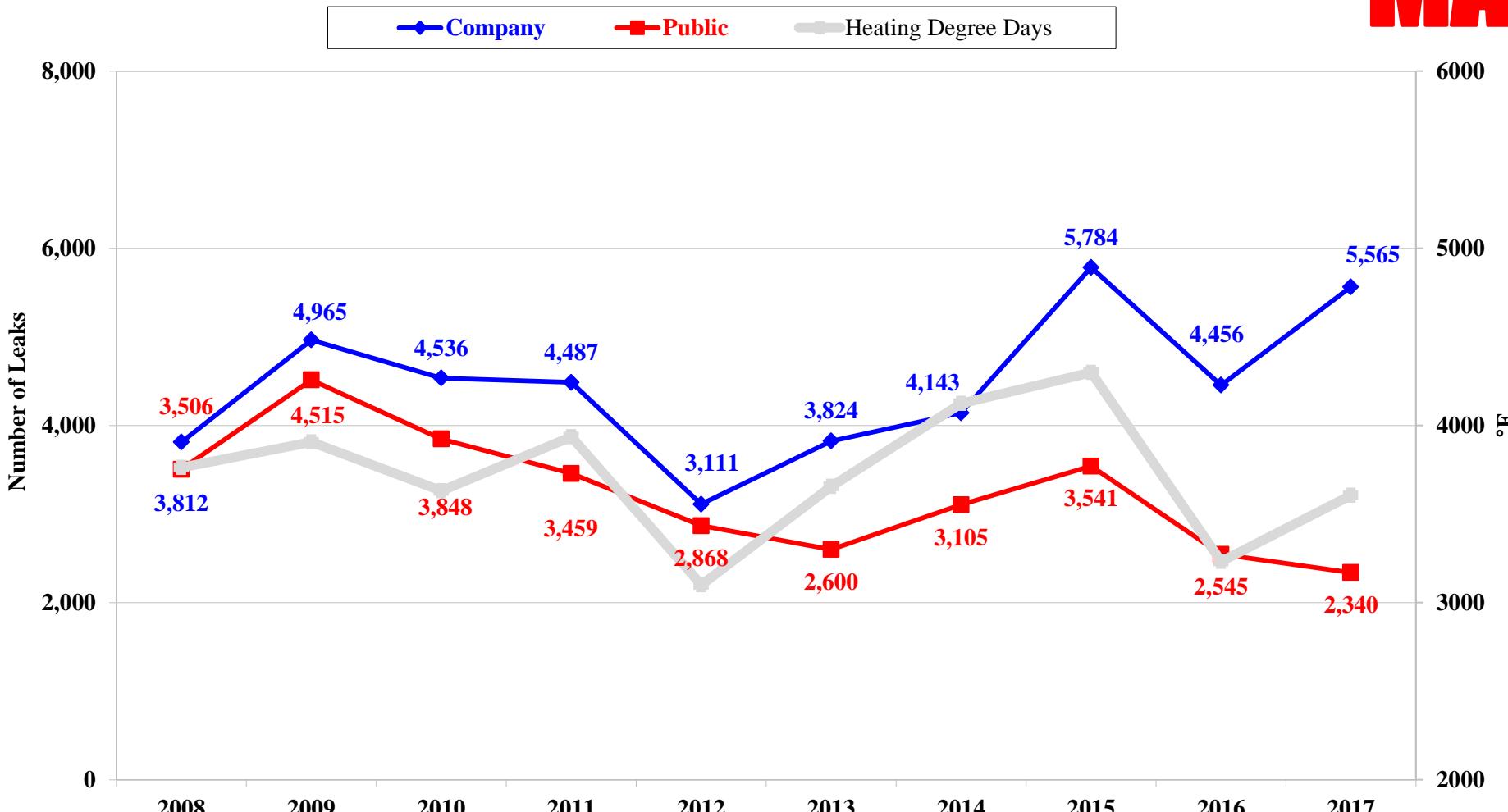


2017 SYSTEM INTEGRITY REPORT

2008 - 2017 LEAK RECEIPTS

By Discovery Source (Excluding damages)

MA

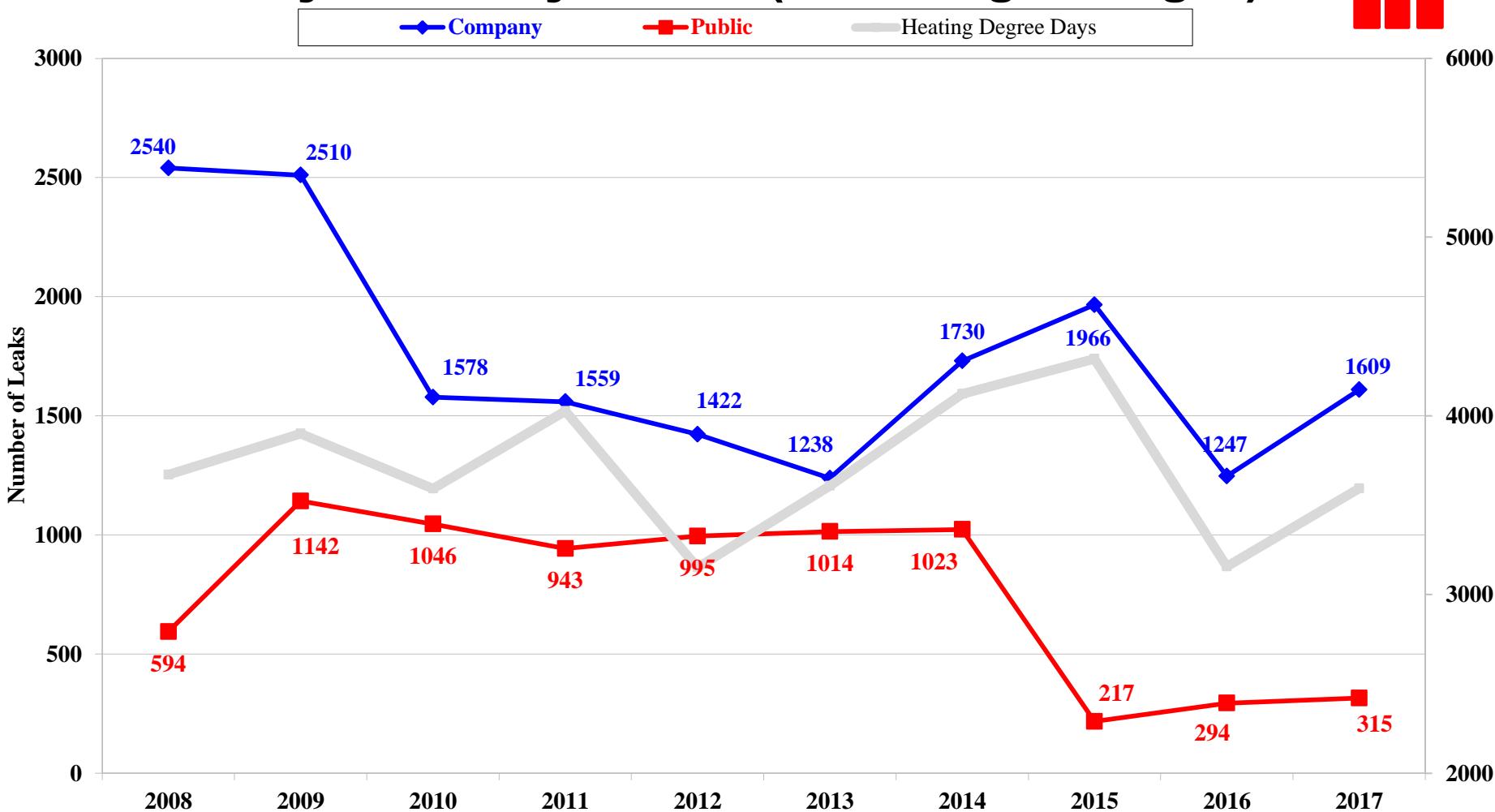


2017 SYSTEM INTEGRITY REPORT

2008 - 2017 LEAK RECEIPTS

By Discovery Source (Excluding damages)

RI



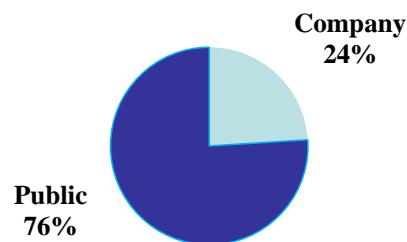
2017 SYSTEM INTEGRITY REPORT

MAIN

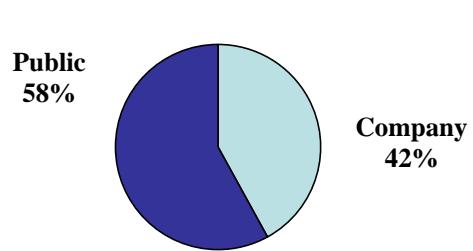
2017 SYSTEM INTEGRITY REPORT

2017 LEAK RECEIPTS BY DISCOVERY SOURCE (EXCLUDING DAMAGES)

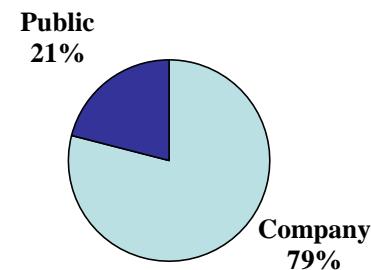
NYC



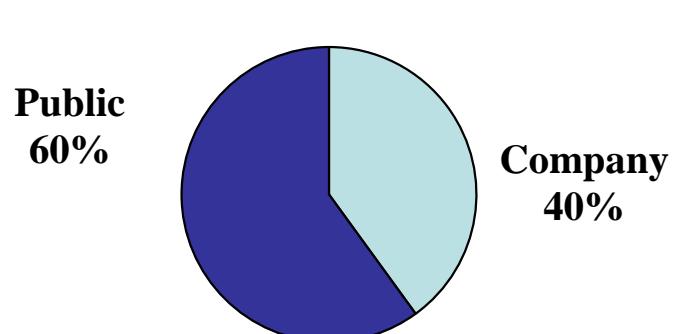
LI



Upstate



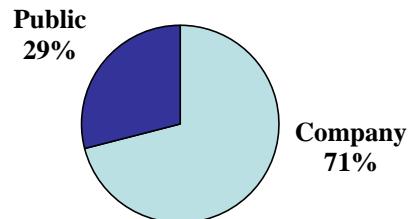
NY State



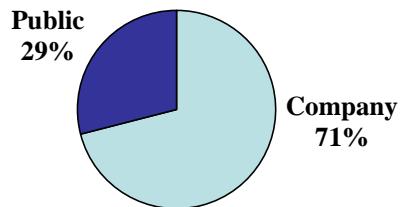
2017 SYSTEM INTEGRITY REPORT

2017 LEAK RECEIPTS BY DISCOVERY SOURCE (EXCLUDING DAMAGES)

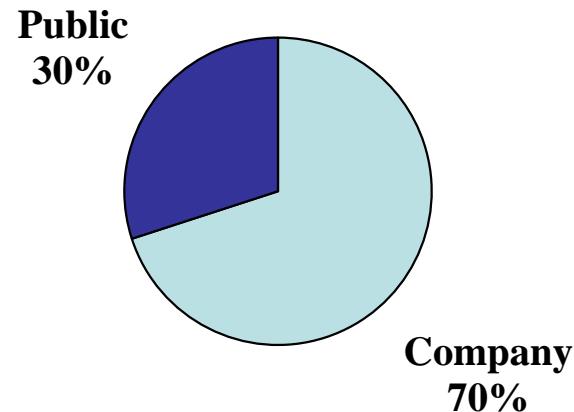
BGC



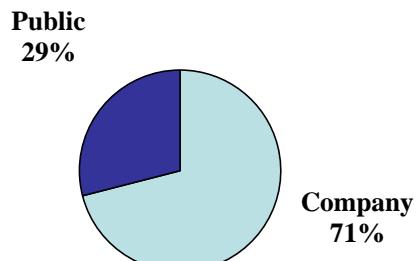
EGC



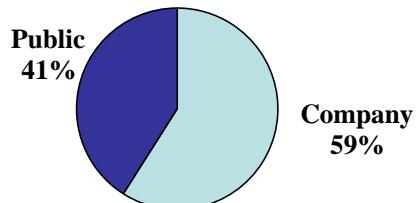
MA State



Cape



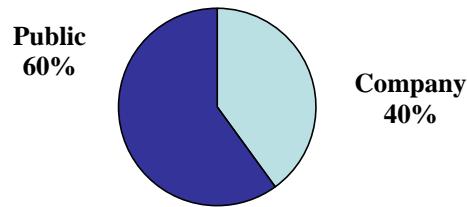
Lowell



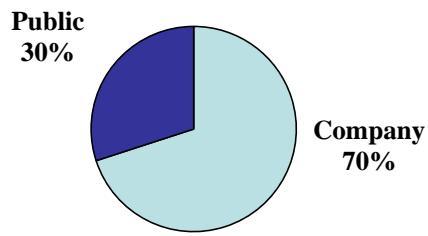
2017 SYSTEM INTEGRITY REPORT

2017 LEAK RECEIPTS BY DISCOVERY SOURCE (EXCLUDING DAMAGES)

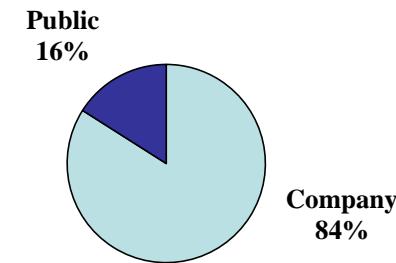
NY State



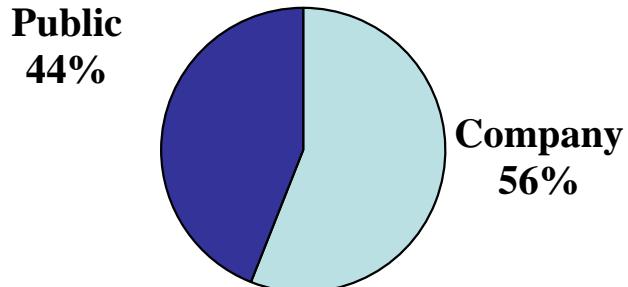
MA State



RI



US-NGrid



2017 SYSTEM INTEGRITY REPORT

NYC

MAIN INVENTORY *(MILES)*

Average Age
Of All NYC
Distribution Main:
49.94 Years

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	771	832	901	940	986	1,030	1,083	1,119	1,241	1,325
Cast Iron	1,750	1,728	1,692	1,674	1,651	1,622	1,586	1,566	1,413	1,357
PROTECTED STEEL	1,130	1,127	1,127	1,153	1,165	1,165	1,151	1,144	1,145	1,135
UNPROT'D STEEL	389	382	375	342	326	318	314	314	318	324
Other	-	-	-	-	-	-	-	-	-	-
Ductile Iron	-	-	-	-	-	-	-	-	-	-
TOTAL MAIN	4,040	4,069	4,095	4,109	4,128	4,135	4,134	4,143	4,118	4,141

nationalgrid

Protected and Unprotected Steel inventory ran by Corrosion Department.

DOT-Reported Distribution Pipe Inventories

2017 SYSTEM INTEGRITY REPORT

MAIN INVENTORY *(MILES)*

Average Age
Of All LI
Distribution Main:
39.69 Years

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	2,711	2,908	2,968	3,034	3,115	3,218	3,320	3,425	3,603	3,763
Cast Iron	385	378	355	345	337	331	317	312	276	261
PROTECTED STEEL	1,137	1,139	1,143	1,147	1,146	1,150	1,153	1,149	1,142	1,147
UNPROT'D STEEL	3,496	3,389	3,341	3,296	3,245	3,193	3,141	3,095	3,092	3,013
Other	-	-	-	-	-	-	-	-	-	-
Ductile Iron	-	-	-	-	-	-	-	-	-	-
TOTAL MAIN	7,729	7,814	7,807	7,822	7,843	7,892	7,931	7,981	8,113	8,184

Protected and Unprotected Steel inventory ran by Corrosion Department.

DOT-Reported Distribution Pipe Inventories

2017 SYSTEM INTEGRITY REPORT

UPSTATE

MAIN INVENTORY *(MILES)*

Average Age
Of All Upstate
Distribution Main:
39.07 Years

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	3,948	4,028	4,082	4,119	4,201	4,283	4,361	4,444	4,544	4,643
Cast Iron	713	668	639	612	585	548	523	489	453	406
PROTECTED STEEL	3,542	3,526	3,526	3,526	3,528	3,528	3,528	3,530	3,530	3,522
UNPROT'D STEEL	286	285	276	271	238	236	231	227	218	212
Other	-	-	-	-	-	-	-	-	-	-
Ductile Iron	-	-	-	-	-	-	-	-	-	-
TOTAL MAIN	8,489	8,507	8,523	8,528	8,552	8,594	8,643	8,690	8,745	8,783

2017 SYSTEM INTEGRITY REPORT

NY STATE

MAIN INVENTORY *(MILES)*

Average Age
Of All NY State
Distribution Main:
41.48 Years

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	7,430	7,768	7,951	8,093	8,302	8,531	8,764	8,988	9,388	9,731
Cast Iron	2,848	2,774	2,686	2,631	2,573	2,501	2,426	2,367	2,142	2,024
PROTECTED STEEL	5,809	5,792	5,796	5,826	5,839	5,843	5,832	5,823	5,817	5,804
UNPROT'D STEEL	4,171	4,056	3,992	3,909	3,809	3,747	3,686	3,636	3,628	3,549
Other	-	-	-	-	-	-	-	-	-	-
Ductile Iron	-	-	-	-	-	-	-	-	-	-
TOTAL MAIN	20,258	20,390	20,425	20,459	20,523	20,621	20,708	20,814	20,976	21,108

nationalgrid

Protected and Unprotected Steel inventory ran by Corrosion Department.

DOT-Reported Distribution Pipe Inventories

2017 SYSTEM INTEGRITY REPORT

BGC

MAIN INVENTORY *(MILES)*

Average Age
Of All BGC
Distribution Main:
52.01 Years

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	1,548	1,637	1,732	1,826	1,946	2,054	2,179	2,279	2,389	2,533
Cast Iron	2,255	2,219	2,167	2,123	2,061	2,005	1,946	1,888	1,839	1,768
Recond. Cast Iron	-	-	-	-	-	-	-	-	5	5
PROTECTED STEEL	964	990	1,022	1,041	1,045	1,040	1,028	997	988	974
UNPROT'D STEEL	1,479	1,418	1,360	1,302	1,256	1,225	1,189	1,181	1,145	1,087
Other	0	0	0	0	0	0	-	5	-	-
Ductile Iron	-	-	-	-	-	-	-	-	-	-
TOTAL MAIN	6,247	6,264	6,282	6,292	6,309	6,324	6,342	6,350	6,366	6,367

2017 SYSTEM INTEGRITY REPORT

EGC

MAIN INVENTORY *(MILES)*

Average Age
Of All EGC
Distribution Main:
37.20 Years

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	403	405	409	412	416	422	427	433	440	444
Cast Iron	93	92	91	88	86	84	81	79	76	73
PROTECTED STEEL	328	335	337	337	337	337	335	334	332	331
UNPROT'D STEEL	32	26	24	22	21	19	19	19	19	18
Other	-	-	-	-	-	-	-	-	-	-
Ductile Iron	-	-	-	-	-	-	-	-	-	-
TOTAL MAIN	855	858	860	859	860	863	863	865	867	866

2017 SYSTEM INTEGRITY REPORT

CAPE

**MAIN
INVENTORY
*(MILES)***

Average Age
Of All Cape
Distribution Main:
28.41 Years

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	1,454	1,462	1,479	1,518	1,575	1,603	1,645	1,672	1,704	1,738
Cast Iron	0	0	0	0	-	-	-	-	-	-
PROTECTED STEEL	691	706	717	721	722	722	719	715	707	690
UNPROT'D STEEL	257	241	222	187	143	121	97	82	66	48
Other	-	-	-	-	-	-	-	-	-	-
Ductile Iron	-	-	-	-	-	-	-	-	-	-
TOTAL MAIN	2,402	2,409	2,419	2,427	2,440	2,445	2,462	2,469	2,477	2,475

2017 SYSTEM INTEGRITY REPORT

LOWELL

MAIN INVENTORY *(MILES)*

Average Age
Of All Lowell
Distribution Main:
36.62 Years

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	571	581	590	606	623	639	665	683	693	716
Cast Iron	130	126	122	118	113	105	99	97	96	90
PROTECTED STEEL	592	597	601	599	575	570	566	552	536	526
UNPROT'D STEEL	87	79	73	67	80	76	66	63	70	66
Other	-	-	-	-	-	-	-	-	-	-
Ductile Iron	-	-	-	-	-	-	-	-	-	-
TOTAL MAIN	1,380	1,383	1,386	1,390	1,391	1,389	1,396	1,395	1,395	1,397

2017 SYSTEM INTEGRITY REPORT

MA

MAIN INVENTORY *(MILES)*

Average Age
Of All MA
Distribution Main:
43.66 Years

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	3,975	4,086	4,210	4,362	4,560	4,718	4,916	5,067	5,225	5,431
Cast Iron	2,478	2,437	2,380	2,330	2,260	2,194	2,127	2,064	2,006	1,930
Recond. Cast Iron	-	-	-	-	-	-	-	-	5	5
PROTECTED STEEL	2,574	2,628	2,676	2,698	2,680	2,669	2,649	2,598	2,562	2,520
UNPROT'D STEEL	1,856	1,763	1,679	1,579	1,500	1,440	1,372	1,345	1,299	1,219
Other	-	-	-	-	-	-	-	5	-	-
Ductile Iron	-	-	-	-	-	-	-	-	-	-
TOTAL MAIN	10,884	10,915	10,946	10,968	11,000	11,021	11,064	11,079	11,105	11,105

2017 SYSTEM INTEGRITY REPORT

RI

MAIN INVENTORY *(MILES)*

Average Age
Of All RI
Distribution Main:
44.48 Years

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	968	1,002	1,044	1,103	1,168	1,227	1,287	1,378	1,417	1,476
Cast Iron	896	885	878	875	859	831	806	769	754	730
Recond. Cast Iron	-	-	-	-	-	-	-	-	-	-
PROTECTED STEEL	578	551	601	588	597	596	595	595	590	590
UNPROT'D STEEL	664	674	592	580	534	508	483	452	416	395
Other	1	-	-	0	0	0	-	-	-	-
Ductile Iron	17	17	17	17	16	16	16	16	16	16
TOTAL MAIN	3,124	3,129	3,132	3,163	3,174	3,179	3,188	3,210	3,193	3,205

2017 SYSTEM INTEGRITY REPORT

US-NGrid

MAIN INVENTORY *(MILES)*

Average Age
Of All US-NGrid
Distribution Main:
42.44 Years

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	12,373	12,855	13,205	13,558	14,030	14,477	14,968	15,433	16,030	16,642
Cast Iron	6,223	6,097	5,944	5,835	5,692	5,526	5,358	5,200	4,902	4,684
PROTECTED STEEL	8,962	8,971	9,073	9,113	9,116	9,108	9,076	9,016	8,969	7,613
UNPROT'D STEEL	6,691	6,493	6,263	6,069	5,843	5,695	5,541	5,433	5,343	3,944
Other	1	0	0	0	0	0	-	5	-	0
Ductile Iron	17	17	17	17	16	16	16	16	16	16
TOTAL MAIN	34,266	34,433	34,503	34,591	34,697	34,821	34,960	35,103	35,269	35,418

2017 SYSTEM INTEGRITY REPORT

SERVICES

2017 SYSTEM INTEGRITY REPORT

2017 DETAILS OF MAIN LEAK REPAIRS



2017 SYSTEM INTEGRITY REPORT

NY State

MAIN LEAK REPAIRS MATERIAL-CAUSE MATRIX

	<u>CORROSION</u>	<u>MATL/WELD</u>	<u>NAT FORCE</u>	<u>OTH OS FRC</u>	<u>EQUIPMENT</u>	<u>OPERATIONS</u>	<u>CI JT/OTHER</u>	<u>DAMAGES</u>	<u>ALL CAUSES</u>
CAST IRON	40	1	242	2	93	0	3,151	14	3,543
STEEL	769	4	13	25	251	0	5	28	1,095
BARE	556	0	4	1	178	0	2	12	753
COATED	213	4	9	24	73	0	3	16	342
PLASTIC	7	36	9	14	39	6	4	105	220
OTHER	0	0	0	0	0	0	0	0	0
ALL MAINS	816	41	264	41	383	6	3,160	147	4,858

COUNTING EACH INDIVIDUAL REPAIR AS A LEAK

2017 SYSTEM INTEGRITY REPORT

MA

MAIN LEAK REPAIRS MATERIAL-CAUSE MATRIX

	<u>CORROSION</u>	<u>MATL/WELD</u>	<u>NAT FORCE</u>	<u>OTH OS FRC</u>	<u>EQUIPMENT</u>	<u>OPERATIONS</u>	<u>CI JT/OTHER</u>	<u>DAMAGES</u>	<u>ALL CAUSES</u>
CAST IRON	60	0	254	0	148	0	5,201	19	5,682
STEEL	1,131	0	9	1	274	5	17	20	1,457
BARE	873	0	0	0	114	3	7	6	1,003
COATED	258	0	9	1	160	2	10	14	454
PLASTIC	1	9	2	2	92	0	11	73	190
OTHER	0	0	0	0	0	0	0	0	0
ALL MAINS	1,192	9	265	3	514	5	5,229	112	7,329

COUNTING EACH INDIVIDUAL REPAIR AS A LEAK

2017 SYSTEM INTEGRITY REPORT

RI

MAIN LEAK REPAIRS MATERIAL-CAUSE MATRIX

	<u>CORROSION</u>	<u>MATL/WELD</u>	<u>NAT FORCE</u>	<u>OTH OS FRC</u>	<u>EQUIPMENT</u>	<u>OPERATIONS</u>	<u>CL JT/OTHER</u>	<u>DAMAGES</u>	<u>ALL CAUSES</u>
CAST IRON	4	0	26	0	27	0	663	5	725
STEEL	98	0	0	0	22	0	3	3	126
BARE	85	0	0	0	12	0	3	2	0
COATED	13	0	0	0	10	0	0	1	24
PLASTIC	0	0	0	1	9	0	0	8	18
OTHER	0	0	0	0	0	0	0	0	0
ALL MAINS	102	0	26	1	58	0	666	16	869

COUNTING EACH INDIVIDUAL REPAIR AS A LEAK

2017 SYSTEM INTEGRITY REPORT

US-NGrid

MAIN LEAK REPAIRS MATERIAL-CAUSE MATRIX

	<u>CORROSION</u>	<u>MATL/WELD</u>	<u>NAT FORCE</u>	<u>OTH OS FRC</u>	<u>EQUIPMENT</u>	<u>OPERATIONS</u>	<u>CI JT/OTHER</u>	<u>DAMAGES</u>	<u>ALL CAUSES</u>
CAST IRON	104	1	522	2	268	0	9,015	38	9,950
STEEL	1,998	4	22	26	547	5	25	51	2,678
BARE	1,514	0	4	1	304	3	12	20	1,858
COATED	484	4	18	25	243	2	13	31	820
PLASTIC	8	45	11	17	140	6	15	186	428
OTHER	0	0	0	0	0	0	0	0	0
ALL MAINS	2,110	50	555	45	955	11	9,055	275	13,056

COUNTING EACH INDIVIDUAL REPAIR AS A LEAK

2017 SYSTEM INTEGRITY REPORT

NYC

SERVICE INVENTORY *(NUMBER OF SERVICES)*

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	332,591	338,074	344,615	347,496	353,440	359,909	366,434	374,435	385,825	393,930
Copper	139,978	137,480	135,861	135,426	133,994	132,557	129,131	128,402	115,291	111,065
Cast Iron	-	-	-	-	-	-	-	-	-	-
PROTECTED STEEL	56,581	54,399	53,936	53,850	53,399	51,217	48,898	44,147	37,889	36,955
UNPROT'D STEEL	33,561	31,473	30,168	28,804	27,697	25,371	24,450	21,532	29,038	26,896
Other	-	-	-	-	-	-	-	-	-	-
TOTAL SERVICES	562,711	561,426	564,580	565,576	568,530	569,054	568,913	568,516	568,043	568,846

DOT-Reported Pipe Inventories

*NYC 2016 Inventory altered due to DIS (Distribution Information System) data correction.
 DOT Note: The service inventory has been decreasing from 2014 due to abandonment efforts. Fewer new customers have been added to the system.

2017 SYSTEM INTEGRITY REPORT

SERVICE INVENTORY **(NUMBER OF SERVICES)**

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	306,984	329,177	344,421	353,589	365,113	380,534	390,715	400,330	421,376	430,006
Copper	5,684	5,585	5,499	5,421	5,377	5,340	5,308	5,102	4,973	4,290
Cast Iron	-	-	-	-	-	-	-	-	-	-
PROTECTED STEEL	35,449	35,426	35,497	35,459	35,462	35,405	35,554	35,024	35,028	34,628
UNPROT'D STEEL	155,886	138,315	127,771	123,355	115,778	107,215	104,003	100,982	82,797	78,001
Other	-	-	-	-	-	-	-	-	-	-
TOTAL SERVICES	504,003	508,503	513,188	517,824	521,730	528,494	535,580	541,438	544,174	546,925

DOT-Reported Pipe Inventories

DOT Note: Due to the change in systems: Fit Asset to Fortis

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2017 SYSTEM INTEGRITY REPORT

UPSTATE

SERVICE INVENTORY

(NUMBER OF SERVICES)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	347,978	353,007	359,477	366,258	372,322	380,652	388,225	397,003	401,394	408,725
Copper	19,846	19,582	19,115	18,857	18,841	17,969	17,578	17,068	16,501	15,939
Cast Iron	3,364	3,364	3,216	3,175	2,874	1,600	2,109	1,070	862	417
PROTECTED STEEL	19,367	18,593	18,439	18,355	18,338	18,336	18,342	18,345	14,167	14,710
UNPROTD STEEL	142,827	142,796	140,873	139,185	136,880	134,131	129,432	125,009	128,539	124,123
Other	-	-	-	-	-	-	-	-	-	-
TOTAL SERVICES	533,382	537,342	541,120	545,830	549,255	552,688	555,686	558,495	561,463	563,914

DOT-Reported Pipe Inventories

Protected steel services decreased and unprotected steel services increased. The decrease in cathodically protected steel services is due to a large number of services being moved to inactive incorrectly. The count of unprotected steel services is calculated based on the decrease in steel services overall. Because the cathodically protected steel services had a decrease, the unprotected steel services increased based on the formula.

2017 SYSTEM INTEGRITY REPORT

NY STATE

SERVICE INVENTORY **(NUMBER OF SERVICES)**

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	987,553	1,020,258	1,048,513	1,067,343	1,090,875	1,121,095	1,145,374	1,171,768	1,208,595	1,232,661
Copper	165,508	162,647	160,475	159,704	158,212	155,866	152,017	150,572	136,765	131,294
Cast Iron	3,364	3,364	3,216	3,175	2,874	1,600	2,109	1,070	862	417
PROTECTED STEEL	111,397	108,418	107,872	107,664	107,199	104,958	102,794	97,516	87,084	86,293
UNPROTD STEEL	332,274	312,584	298,812	291,344	280,355	266,717	257,885	247,523	240,374	229,020
Other	-	-	-	-	-	-	-	-	-	-
TOTAL SERVICES	1,600,096	1,607,271	1,618,888	1,629,230	1,639,515	1,650,236	1,660,179	1,668,449	1,673,680	1,679,685

DOT-Reported Pipe Inventories

nationalgrid

*NYC 2016 Inventory altered due to DIS (Distribution Information System) data correction 322

*LI 2016 Inventory altered due to Fortis data correction

2017 SYSTEM INTEGRITY REPORT

BGC

SERVICE INVENTORY ***(NUMBER OF SERVICES)***

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	200,261	210,590	222,462	230,205	241,956	251,799	259,524	268,606	275,836	288,814
Copper	10,284	10,079	9,898	9,693	9,502	9,265	9,137	8,969	8,828	8,534
Cast Iron	1,921	1,848	1,775	1,702	1,603	1,549	1,507	1,460	1,414	1,368
PROTECTED STEEL	36,758	35,569	34,114	33,320	32,561	31,947	31,464	30,828	30,358	29,271
UNPROTD STEEL	131,350	126,422	120,304	116,389	112,383	113,114	110,226	106,945	103,897	98,873
Other	102,183	98,542	93,385	91,850	88,417	83,277	83,309	83,606	84,056	80,045
TOTAL SERVICES	482,757	483,050	481,938	483,159	486,422	490,951	495,167	500,414	504,389	506,905

DOT- Reported Pipe Inventories

nationalgrid

DOT Note:

Our DOT inventory assumes % of services installed by decade for steel services are cathodically protected and not protected. When we replace those vintages, this causes a decrease in protected steel service inventories

2017 SYSTEM INTEGRITY REPORT

EGC

SERVICE INVENTORY ***(NUMBER OF SERVICES)***

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	27,869	28,369	28,775	29,294	29,869	30,917	31,440	32,128	32,496	33,103
Copper	-	-	-	-	-	-	-	-	-	-
Cast Iron	10	10	10	10	7	6	6	6	4	4
PROTECTED STEEL	5,266	5,083	5,028	4,981	4,929	4,874	4,795	4,736	4,693	4,638
UNPROTD STEEL	5,719	5,535	5,394	5,253	5,114	4,959	4,830	4,590	4,457	4,296
Other	1,914	1,912	1,929	2,005	2,114	2,131	2,144	3,333	7,419	10,059
TOTAL SERVICES	40,778	40,909	41,136	41,543	42,033	42,887	43,215	44,793	49,069	52,100

DOT- Reported Pipe Inventories

Note: Services are duplicated when entered into the CRIS database and is linked to the SPIPE database. The data will be scrubbed by Mapping. Issue found in all MA.

2017 SYSTEM INTEGRITY REPORT

CAPE

SERVICE INVENTORY

(NUMBER OF SERVICES)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	66,728	68,946	70,676	72,315	75,309	77,877	80,517	82,228	83,688	86,137
Copper	-	-	-	-	-	-	-	-	-	-
Cast Iron	18	17	16	15	15	15	16	16	16	15
PROTECTED STEEL	20,935	21,233	21,265	20,908	20,419	20,194	19,806	19,510	19,065	18,178
UNPROT'D STEEL	6,159	6,025	5,872	5,357	4,813	4,569	4,076	3,841	3,622	3,317
Other	10,900	10,511	8,681	8,652	8,774	8,836	9,119	9,670	9,833	9,743
TOTAL SERVICES	104,740	106,732	106,510	107,247	109,330	111,491	113,534	115,265	116,224	117,390

DOT- Reported Pipe Inventories

Note: Our DOT inventory assumes % of services installed by decade for steel services are cathodically protected and not protected. When we replace those vintages, this causes a decrease in protected steel service inventories

Services are duplicated when entered into the CRIS database and is linked to the SPIPE database. The data will be scrubbed by Mapping. Issue found in all MA.

2017 SYSTEM INTEGRITY REPORT

LOWELL

SERVICE INVENTORY

(NUMBER OF SERVICES)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	40,048	41,267	42,312	43,548	44,768	46,169	47,785	48,906	49,651	51,348
Copper	1	1	1	1	1	1	1	1	1	1
Cast Iron	19	14	13	2	-	-	-	-	-	-
PROTECTED STEEL	23,659	23,391	22,944	22,515	22,116	21,629	20,999	20,515	20,213	19,449
UNPROT'D STEEL	7,569	6,956	6,676	6,346	6,077	5,759	5,424	5,228	5,105	4,761
Other	1,785	1,707	1,541	1,199	1,036	1,114	1,111	1,256	1,661	1,966
TOTAL SERVICES	73,081	73,336	73,487	73,611	73,998	74,672	75,320	75,906	76,631	77,525

DOT- Reported Pipe Inventories

Note: Our DOT inventory assumes % of services installed by decade for steel services are cathodically protected and not protected. When we replace those vintages, this causes a decrease in protected steel service inventories

Services are duplicated when entered into the CRIS database and is linked to the SPIPE database. The data will be scrubbed by Mapping. Issue found in all MA.

2017 SYSTEM INTEGRITY REPORT

MA

SERVICE INVENTORY

(NUMBER OF SERVICES)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	334,906	349,172	364,225	375,362	391,902	406,762	419,266	431,868	441,671	459,402
Copper	10,285	10,080	9,899	9,694	9,503	9,266	9,138	8,970	8,829	8,535
Cast Iron	1,968	1,889	1,814	1,729	1,625	1,570	1,529	1,482	1,434	1,387
PROTECTED STEEL	86,618	85,276	83,351	81,724	80,025	78,644	77,064	75,589	74,329	71,536
UNPROT'D STEEL	150,797	144,938	138,246	133,345	128,387	128,401	124,556	120,604	117,081	111,247
Other	116,782	112,672	105,536	103,706	100,341	95,358	95,683	97,865	102,969	101,813
TOTAL SERVICES	701,356	704,027	703,071	705,560	711,783	720,001	727,236	736,378	746,313	753,920

DOT- Reported Pipe Inventories

Note: Our DOT inventory assumes % of services installed by decade for steel services are cathodically protected and not protected. When we replace those vintages, this causes a decrease in protected steel service inventories

Services are duplicated when entered into the CRIS database and is linked to the SPIPE database. The data will be scrubbed by Mapping. Issue found in all MA.

2017 SYSTEM INTEGRITY REPORT

RI

SERVICE INVENTORY *(NUMBER OF SERVICES)*

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	109,144	112,313	115,718	121,770	126,474	130,002	133,024	136,700	140,206	142,956
Copper	178	177	171	209	208	207	205	202	201	192
Cast Iron	175	168	162	194	189	185	174	137	134	129
PROTECTED STEEL	12,066	11,260	11,206	10,422	10,285	10,150	9,989	9,800	9,585	9,456
UNPROT'D STEEL	63,919	62,462	59,800	56,049	53,449	51,387	49,265	47,104	44,806	42,969
Other	1,470	1,405	1,348	1,322	1,085	1,000	958	900	854	803
TOTAL SERVICES	186,952	187,785	188,405	189,966	191,690	192,931	193,615	194,843	195,786	196,505

DOT- Reported Pipe Inventories

Note: Cathodically protected steel services decreased by 129 services. This is due to assigning materials to the longest segment in a service. Some services had a small amount of plastic cut in that changed the material of the service. 15 Ductile iron services in R.I. are counted as "Other" services

2017 SYSTEM INTEGRITY REPORT

US-NGrid

SERVICE INVENTORY

(NUMBER OF SERVICES)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plastic	1,431,603	1,481,743	1,528,456	1,564,475	1,609,251	1,657,859	1,697,664	1,740,336	1,790,472	1,835,019
Copper	175,971	172,904	170,545	169,607	167,923	165,339	161,360	159,744	145,795	140,021
Cast Iron	5,507	5,421	5,192	5,098	4,688	3,355	3,812	2,689	2,430	1,933
PROTECTED STEEL	210,081	204,954	202,429	199,810	197,509	193,752	189,847	182,905	170,998	167,285
UNPROTD STEEL	546,990	519,984	496,858	480,738	462,191	446,505	431,706	415,231	402,261	383,236
Other	118,252	114,077	106,884	105,028	101,426	96,358	96,641	98,765	103,823	102,616
TOTAL SERVICES	2,488,404	2,499,083	2,510,364	2,524,756	2,542,988	2,563,168	2,581,030	2,599,670	2,615,779	2,630,110

2017 SYSTEM INTEGRITY REPORT

2017 MATERIAL CAUSE MATRIX (SERVICE LEAK REPAIR)



2017 SYSTEM INTEGRITY REPORT

NYC

2017 SERVICE LEAKS **MATERIAL-CAUSE MATRIX**

	<u>CORROSION</u>	<u>MATL/WELD</u>	<u>NAT FORCE</u>	<u>OTH OS FRC</u>	<u>EQUIPMENT</u>	<u>OPERATIONS</u>	<u>OTHER</u>	<u>DAMAGES</u>	<u>ALL CAUSES</u>
CAST IRON	0	0	0	0	0	0	0	0	0
COPPER	27	1	9	17	210	2	0	48	314
STEEL	257	0	18	4	284	2	0	18	583
BARE	142	0	15	4	67	0	0	10	238
COATED	115	0	3	0	217	2	0	8	345
PLASTIC	4	1	18	39	280	2	0	171	515
OTHER	0	0	0	0	0	0	0	0	0
ALL SVCS	288	2	45	60	774	6	0	237	1,412

2017 SYSTEM INTEGRITY REPORT

LI

2017 SERVICE LEAKS

MATERIAL-CAUSE MATRIX

	<u>CORROSION</u>	<u>MATL/WELD</u>	<u>NAT FORCE</u>	<u>OTH OS FRC</u>	<u>EQUIPMENT</u>	<u>OPERATIONS</u>	<u>OTHER</u>	<u>DAMAGES</u>	<u>ALL CAUSES</u>
CAST IRON	0	0	0	0	0	0	0	0	0
COPPER	5	0	0	1	25	0	0	1	32
STEEL	711	0	2	4	186	0	5	44	952
BARE	555	0	2	4	154	0	3	35	753
COATED	156	0	0	0	32	0	2	9	199
PLASTIC	104	24	1	13	354	2	6	346	850
OTHER	0	0	0	0	0	0	0	0	0
ALL SVCS	820	24	3	18	565	2	11	391	1,834

2017 SYSTEM INTEGRITY REPORT

UPSTATE

2017 SERVICE LEAKS

MATERIAL-CAUSE MATRIX

	<u>CORROSION</u>	<u>MATL/WELD</u>	<u>NAT FORCE</u>	<u>OTH OS FRC</u>	<u>EQUIPMENT</u>	<u>OPERATIONS</u>	<u>OTHER</u>	<u>DAMAGES</u>	<u>ALL CAUSES</u>
CAST IRON	4	0	0	0	0	0	1	1	6
COPPER	18	0	1	0	10	0	2	4	35
STEEL	287	7	15	5	83	0	34	12	443
BARE	103	1	3	3	18	0	6	3	137
COATED	184	6	12	2	65	0	28	9	306
PLASTIC	15	18	17	14	107	1	14	255	441
OTHER	0	0	0	0	0	0	0	0	0
ALL SVCS	324	25	33	19	200	1	51	272	925

2017 SYSTEM INTEGRITY REPORT

NY STATE

2017 SERVICE LEAKS MATERIAL-CAUSE MATRIX

	<u>CORROSION</u>	<u>MATL/WELD</u>	<u>NAT FORCE</u>	<u>OTH OS FRC</u>	<u>EQUIPMENT</u>	<u>OPERATIONS</u>	<u>OTHER</u>	<u>DAMAGES</u>	<u>ALL CAUSES</u>
CAST IRON	4	0	0	0	0	0	1	1	6
COPPER	50	1	10	18	245	2	2	53	381
STEEL	1,255	7	35	13	553	2	39	74	1,978
BARE	800	1	20	11	239	0	9	48	1,128
COATED	455	6	15	2	314	2	30	26	850
PLASTIC	123	43	36	66	741	5	20	772	1,806
OTHER	0	0	0	0	0	0	0	0	0
ALL SVCS	1,432	51	81	97	1,539	9	62	900	4,171

2017 SYSTEM INTEGRITY REPORT

BGC

2017 SERVICE LEAKS MATERIAL-CAUSE MATRIX

	<u>CORROSION</u>	<u>MATL/WELD</u>	<u>NAT FORCE</u>	<u>OTH OS FRC</u>	<u>EQUIPMENT</u>	<u>OPERATIONS</u>	<u>OTHER</u>	<u>DAMAGES</u>	<u>ALL CAUSES</u>
CAST IRON	7	0	6	0	9	0	20	1	43
COPPER	43	0	1	0	51	0	8	8	111
STEEL	1,566	2	5	2	162	1	38	34	1,810
BARE	1,451	0	2	2	103	1	18	22	1,599
COATED	115	2	3	0	59	0	20	12	211
PLASTIC	20	11	17	13	445	0	97	236	839
OTHER	1	0	1	1	29	0	3	1	36
ALL SVCS	1,637	13	30	16	696	1	166	280	2,839

2017 SYSTEM INTEGRITY REPORT

EGC

2017 SERVICE LEAKS **MATERIAL-CAUSE MATRIX**

	<u>CORROSION</u>	<u>MATL/WELD</u>	<u>NAT FORCE</u>	<u>OTH OS FRC</u>	<u>EQUIPMENT</u>	<u>OPERATIONS</u>	<u>OTHER</u>	<u>DAMAGES</u>	<u>ALL CAUSES</u>
CAST IRON	0	0	0	0	0	0	1	0	1
COPPER	0	0	0	0	0	0	0	0	0
STEEL	57	0	1	0	13	0	0	4	75
BARE	50	0	0	0	10	0	0	1	61
COATED	7	0	1	0	3	0	0	3	14
PLASTIC	1	3	0	0	68	0	2	24	98
OTHER	0	0	0	0	0	0	0	0	0
ALL SVCS	58	3	1	0	81	0	3	28	174

COUNTING EACH INDIVIDUAL REPAIR AS A LEAK

2017 SYSTEM INTEGRITY REPORT

CAPE 2017 SERVICE LEAKS MATERIAL-CAUSE MATRIX

	<u>CORROSION</u>	<u>MATL/WELD</u>	<u>NAT FORCE</u>	<u>OTH OS FRC</u>	<u>EQUIPMENT</u>	<u>OPERATIONS</u>	<u>OTHER</u>	<u>DAMAGES</u>	<u>ALL CAUSES</u>
CAST IRON	0	0	0	0	1	0	0	0	1
COPPER	0	0	0	0	0	0	0	0	0
STEEL	31	0	0	0	62	0	1	5	99
BARE	7	0	0	0	3	0	0	1	11
COATED	24	0	0	0	59	0	1	4	88
PLASTIC	0	3	0	1	108	0	16	88	216
OTHER	0	0	0	0	5	0	0	0	5
ALL SVCS	31	3	0	1	176	0	17	93	321

2017 SYSTEM INTEGRITY REPORT

LOWELL 2017 SERVICE LEAKS MATERIAL-CAUSE MATRIX

	<u>CORROSION</u>	<u>MATL/WELD</u>	<u>NAT FORCE</u>	<u>OTH OS FRC</u>	<u>EQUIPMENT</u>	<u>OPERATIONS</u>	<u>OTHER</u>	<u>DAMAGES</u>	<u>ALL CAUSES</u>
CAST IRON	0	0	0	0	0	0	1	0	1
COPPER	0	0	0	0	0	0	0	0	0
STEEL	74	0	0	0	53	0	1	9	137
BARE	30	0	0	0	3	0	0	2	35
COATED	44	0	0	0	50	0	1	7	102
PLASTIC	0	0	0	0	48	0	2	42	92
OTHER	0	0	0	0	1	0	0	0	1
ALL SVCS	74	0	0	0	102	0	4	51	231

2017 SYSTEM INTEGRITY REPORT

MA

2017 SERVICE LEAKS **MATERIAL-CAUSE MATRIX**

	<u>CORROSION</u>	<u>MATL/WELD</u>	<u>NAT FORCE</u>	<u>OTH OS FRC</u>	<u>EQUIPMENT</u>	<u>OPERATIONS</u>	<u>OTHER</u>	<u>DAMAGES</u>	<u>ALL CAUSES</u>
CAST IRON	7	0	6	0	10	0	22	1	46
COPPER	43	0	1	0	51	0	8	8	111
STEEL	1,728	2	6	2	290	1	40	52	2,121
BARE	1,538	0	2	2	119	1	18	26	1,706
COATED	190	2	4	0	171	0	22	26	415
PLASTIC	21	17	17	14	669	0	117	390	1,245
OTHER	1	0	1	1	35	0	3	1	42
									0
ALL SVCS	1,800	19	31	17	1,055	1	190	452	3,565

2017 SYSTEM INTEGRITY REPORT

RI

2017 SERVICE LEAKS MATERIAL-CAUSE MATRIX

	<u>CORROSION</u>	<u>MATL/WELD</u>	<u>NAT FORCE</u>	<u>OTH OS FRC</u>	<u>EQUIPMENT</u>	<u>OPERATIONS</u>	<u>OTHER</u>	<u>DAMAGES</u>	<u>ALL CAUSES</u>
CAST IRON	1	0	2	0	1	0	0	0	4
COPPER	3	0	0	0	0	0	0	2	5
STEEL	452	0	0	0	27	0	2	15	496
BARE	429	0	0	0	17	0	2	12	460
COATED	23	0	0	0	10	0	0	3	36
PLASTIC	3	2	0	10	46	0	3	84	148
OTHER	1	0	0	0	0	0	0	0	1
ALL SVCS	460	2	2	10	74	0	5	101	654

2017 SYSTEM INTEGRITY REPORT

US-NGrid

2017 SERVICE LEAKS

MATERIAL-CAUSE MATRIX

	<u>CORROSION</u>	<u>MATL/WELD</u>	<u>NAT FORCE</u>	<u>OTH OS FRC</u>	<u>EQUIPMENT</u>	<u>OPERATIONS</u>	<u>OTHER</u>	<u>DAMAGES</u>	<u>ALL CAUSES</u>
CAST IRON	12	0	8	0	11	0	23	2	56
COPPER	96	1	11	18	296	2	10	63	497
STEEL	3,435	9	41	15	870	3	81	141	4,595
BARE	2,767	1	22	13	375	1	29	86	3,294
COATED	668	8	19	2	495	2	52	55	1,301
PLASTIC	147	62	53	90	1,456	5	140	1,246	3,199
OTHER	2	0	1	1	35	0	3	1	43
ALL SVCS	3,692	72	114	124	2,668	10	257	1,453	8,390

2017 SYSTEM INTEGRITY REPORT

END OF SYSTEM INTEGRITY REPORT